OCTOBER 15, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Bogeyman or Bonanza?

The automation bogeyman is largely imaginary, the bonanza real – if we defeat our fears . . . page 109

✓ **Metalworking Tackles the Satellite . . . page 120**

✓ **Bolts, Nuts Swing to Net Pricing . . . page 163**

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SIMPLIFYING HEAT EXCHANGER AND CONDENSER FABRICATION

The ease with which heat exchanger and condenser tubes can be rolled into tube sheets depends, to a certain extent, upon the uniformity of tube wall. One of the controlling factors of wall uniformity in the manufacture of seamless steel tubing is the contour of the piercer point.

Phil Morrison, a piercer point man, is shown at work on one of B&W's seamless tube mills. One of his duties is to examine the piercer point between each tube making operation. By making certain that the point has not been deformed in service—and that takes experience and a practiced eye—he helps to control wall uniformity in the pierced tube. He knows that although hot and cold work after the piercing operation can minimize, it cannot eliminate non-uniformity of wall section.

Phil's attention to detail, teamed with specially designed piercing equipment, helps to achieve the quality—"ease of rolling-in"—for B&W Heat Exchanger and Condenser Tubes. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-6051-G

Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

Skagit Yarder-Loader, familiar sight around Northwest logging operations, moves ponderous logs with ease and agility because of rugged yet light-weight boom of Mayari R.

"Materials-handling" in the great North woods

In the sprawling timberlands of the Pacific Northwest they fell the raw materials for lumber, plywood, pulp and matches. Pulling the giant logs to a landing and loading them on big trucks is the job of mobile loggers designed and built by Skagit Steel and Iron Works in Sedro Woolley, Washington.

The logs are heavy and the going's rough, so these mobile loggers must be rugged yet highly maneuverable. To cut down unnecessary weight, Skagit builds the lifting booms from angles and channels of Mayari R low-alloy, high-strength steel. Because Mayari R has a substantially higher yield point than carbon steel, an amply strong boom can be built with lighter members. Skagit shop men find that they can weld Mayari R as readily as regular carbon steels, with the same general procedures. And Mayari R has from 5 to 6 times greater resistance to atmospheric corrosion, a distinct advantage under damp forest conditions.

All the significant properties of Mayari R, along with dozens of case histories and application photographs, are interestingly set forth in Catalog 353. If you would like to have a copy just get in touch with the Bethlehem district sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corp. *Export Distributor:* Bethlehem Steel Export Corp.

Mayari R...High-Strength, Corrosion-Resisting Steel

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you'll want the faster speeds and extra convenience features of the new –

hobart dc rectifier welder

new "Diverter Path" design for smoother welding, easier arc striking and lower spatter loss.

new design for better efficiency, free from moving cores or coils and with good inherent power factor correction, that requires no capacitors.

new Controls bring infinite welding settings that give the operator any number of machine adjustments for various types of electrodes and positions.

New Advanced Design — New Advantages

Hobart's new Selenium Rectifier Type DC Arc Welder offers greater advantages for you in modern welding performance that you'll want to know about.

Check the output, ratings, extra built-in features and make some comparisons if you want to be sure about the extra value and savings possible in this new Hobart Rectifier.

Designed for high efficiency, lower operating and maintenance cost, so important today in helping to combat rising material and labor costs.

You'll find a big difference in welding machines once you've tried Hobart. Send for detailed specifications that will give the complete story. **HOBART BROTHERS COMPANY, BOX ST-1061 TROY, OHIO — 'PHONE 21223.**

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Without obligation, send me information on:_____ amp. capacity DC Rectifier Arc Welder. ☐ New faster type iron powder electrodes. ☐ Latest catalog and details on _____ type arc welder.

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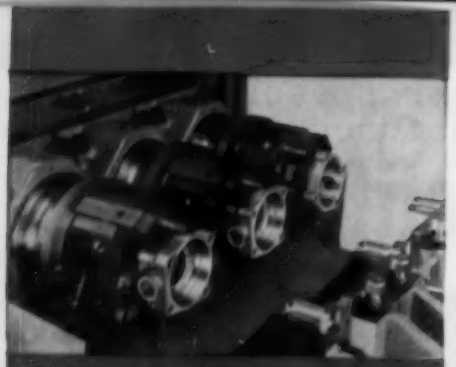
Address_____

City_____ State_____



Showing parts mounted in the chuck. Without chuck changes, any of three parts having different exterior forms but identical interior contours can be accommodated.

Intricate contouring is fast, accurate—

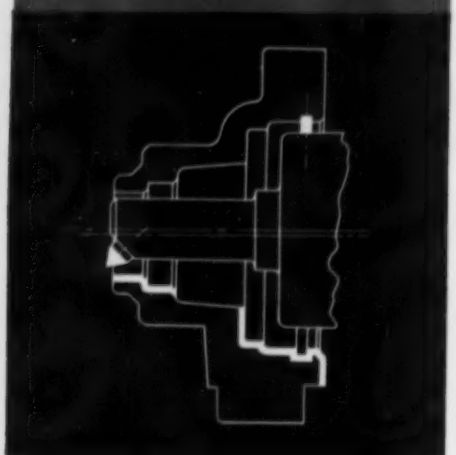
12 operations in one cycle!

Direct cam action—no levers—provides Ex-Cell-O Precision Boring Machines with accuracy, versatility and speed in difficult contouring operations.

In the application shown here—contouring an internal form in die-cast aluminum end covers—limits on diameters are held as close as plus or minus .0005 inch, and three work pieces are completed at a time. 12 separate operations are performed in one machine cycle, including precision boring, facing, chamfering and grooving.

Cams can be changed in minutes. Cam assembly swings out for quick, easy change. All motors are outside the base.

Another Ex-Cell-O feature is the large chip chute, cast as an integral part of the base. There are no openings where chips or coolant can enter the base. Contact your Ex-Cell-O representative or write direct for complete information.



12 operations are performed in one machine cycle. Heavy lines denote surfaces machined.

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DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-C2

XLO

At left: The Ex-Cell-O Styled 312 Cam Operated Precision Boring Machine. A smaller model, the Ex-Cell-O Style 308, is also available because of the demand for this type of machine.

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This Sturdy Precision
Tool Grinder
BY EX-CELL-O

Style 44-A, is one of the newest in a complete line made by Ex-Cell-O for sharpening carbides, high speed steels, and cast alloys. All are double end models, equipped for face grinding on cup-type wheels; for efficient and economical conditioning of single-point tools.

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Tables are big to give good support to the tools. They are easily adjustable.

There are Ex-Cell-O Tool Grinders to suit the needs of every shop, large or small. For data on this complete Tool Grinder line, write Ex-Cell-O in Detroit, or call your local Ex-Cell-O representative.

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that damages your machines and hurts company morale

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trap dust at its source!

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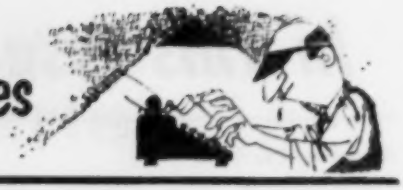
behind the scenes



Birth of a Bogeyman

We know a 220 lb Ph.D., who under severe cross-questioning, broke and confessed that he had never heard of William Draper, M.D., LL.D., of the University of New York, nor of his sister, Miss Dorothy Catherine.

"I know a Sam Draper, from Keokuk," he mumbled, "but his sister's name isn't Dorothy Catherine, because Sam doesn't have a sister."

The dishwasher in the fourth floor lunchroom happened to overhear our conversation. "You *are* a dope!" she broke in. "Surely everybody knows that Professor Draper early in 1840 made the first photographic human portrait using sunlight exposure, and that his subject was his sister, Dorothy Catherine!"

Well, now that we are talking about photography, let's get around to one of STEEL's artists, Tom Bryan, and leave the Ph.D. to the dishwasher. Tom was ordered to cook up a cover and a layout illustrating this week's Program for Management story, "Automation: Bogeyman or Bonanza?" (page 109). Previous talk mentioned the use of photographic illustrations, but the only character available as a model for the bogeyman was ol' Shrdlu; he, however, was too sensitive to sit for his portrait under those conditions.

The bogeyman that Tom designed—probably based on childhood memories of his neighbors in West Virginia—and the little man cowering from the implied impact of automation on labor, are excellent examples of the triumph of art over photography.

Pens Vs. Lens

The visual assistance from original art and layout is exemplified in several ways in this management article. Material is arranged and presented in such a way that the reader will find himself soaking up information two or three ways at once. He will learn a great deal about the social and economic problems stirred up by automation, yet not be aware that his impressions are being gained subconsciously as well as consciously.

Here is a Program for Management story that is as timely as it is informative. Moreover, it is exceptionally easy to read because it is tailored and groomed for quick consumption.

Something to Sniff at

It is quite natural to go from tailoring and grooming to Dr. Oliver L. Marton, chief perfumer of Shulton Inc., Clifton, N. J. Speaking before the 130th national meeting of the American Chemical Society in Atlantic City, N. J., Dr. Marton declared that American men shouldn't be self-conscious about ads directed at them implying that they should smell better. "American men," he said, "spend three times as much as their womenfolk on perfumed products!"

WELL! and *well!* At this point we feel a poem coming on:

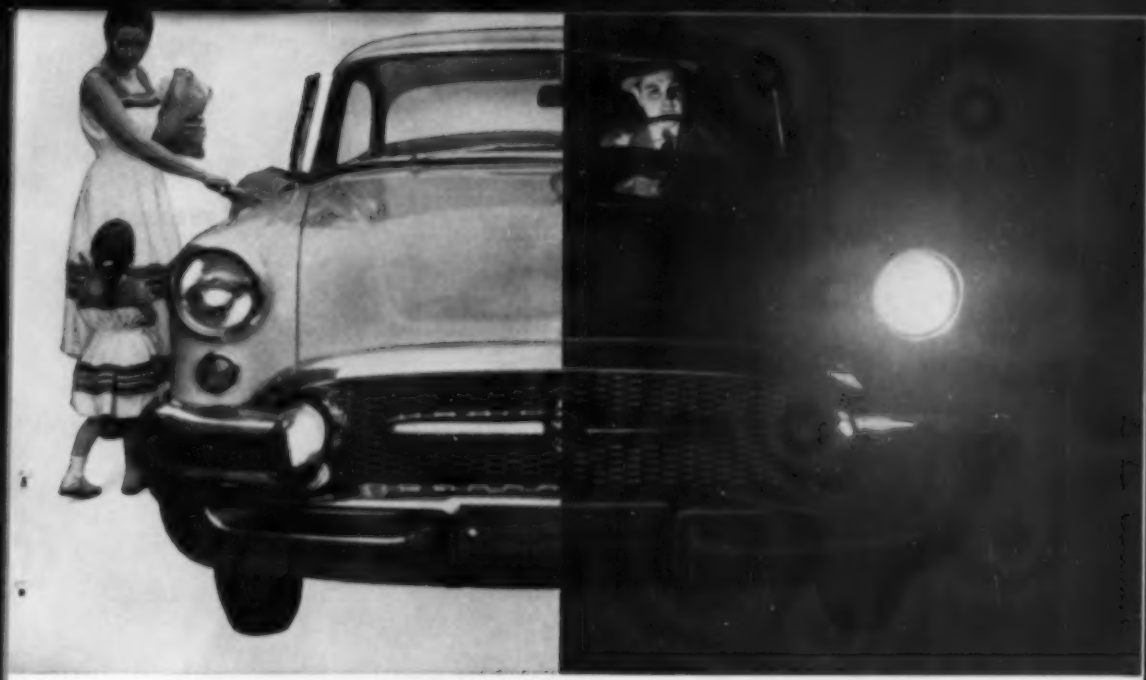
The Stone Age Man paid little mind
To caves wherein he dwelt;
Indeed, he never even cared
About the way he smelt.
But why pretend? Throughout the years
(This simple truth may vex!)
The ladies kidded not when they
Termed men the stronger sex.
But nowadays—well, rowdy-dow!
Just sniff those dashing gents
Who move among us trailing musk
And other lovely scents.
But even if with oils and salves
And lotions we will tinker,
You'll never notice any change
In fundamental stinkers!

Simms Steams

The elapsed time on the watch deal was 16 4/11-minutes. Let's consider now the case of the myopic teller, Forgetful Freddie. A man named Addison Simms (an old Seattle boy) handed Freddie a check. Freddie promptly handed Addison the amount of the dollars in cents, and the amount of the cents in dollars. Bankers don't operate that way in Seattle, so Mr. Simms kicked. This upset Freddie, so he handed over a dollar, a dime and a penny more, but it still wasn't enough. "I got only half of what's coming to me," shouted Addison Simms. If you don't mind dangling prepositions, how much do you reckon the check was made out for?

Shrdlu

(Metalworking Outlook—Page 63)



you live with BRICK . . . 24 hours a day!

365 days and nights a year—wherever you go and whatever you do—you come in contact with products born in and from refractory brick.

Your car and everything in it . . . the cement you drive on . . . the gasoline that powers you—*everything* you see or touch . . . everything that's made or moves owes its very existence to refractory brick. Refractories—containing and controlling the many flames of industry—produce the steel, electric power, rubber and cement you use *continuously* in daily living.

Therefore, the making of refractory products is the most basically necessary industry there is. Refractories, you see, create industry . . . without them, there would be no industry.

Providing industry with Castables, Plastics, Ramming Mixes, Fire Brick, Mortars, Insulating Brick and Insulation, General Refractories Company draws resources from all over the globe—and operates the world's largest, most-modern refractories research laboratory.

A Complete Refractories Service
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A COMPLETE REFRACTORIES SERVICE FOR THE STEEL INDUSTRY

OLIVE HILL BF and OLIVE HILL HI-FIRED brick rank high in any list of prominent and widely used brands of blast furnace refractories. Manufactured from dense-burning Kentucky flint fire clays by Grefco's unique manufacturing processes, OLIVE HILL brick set a standard for blast furnace refractory quality and workmanship.

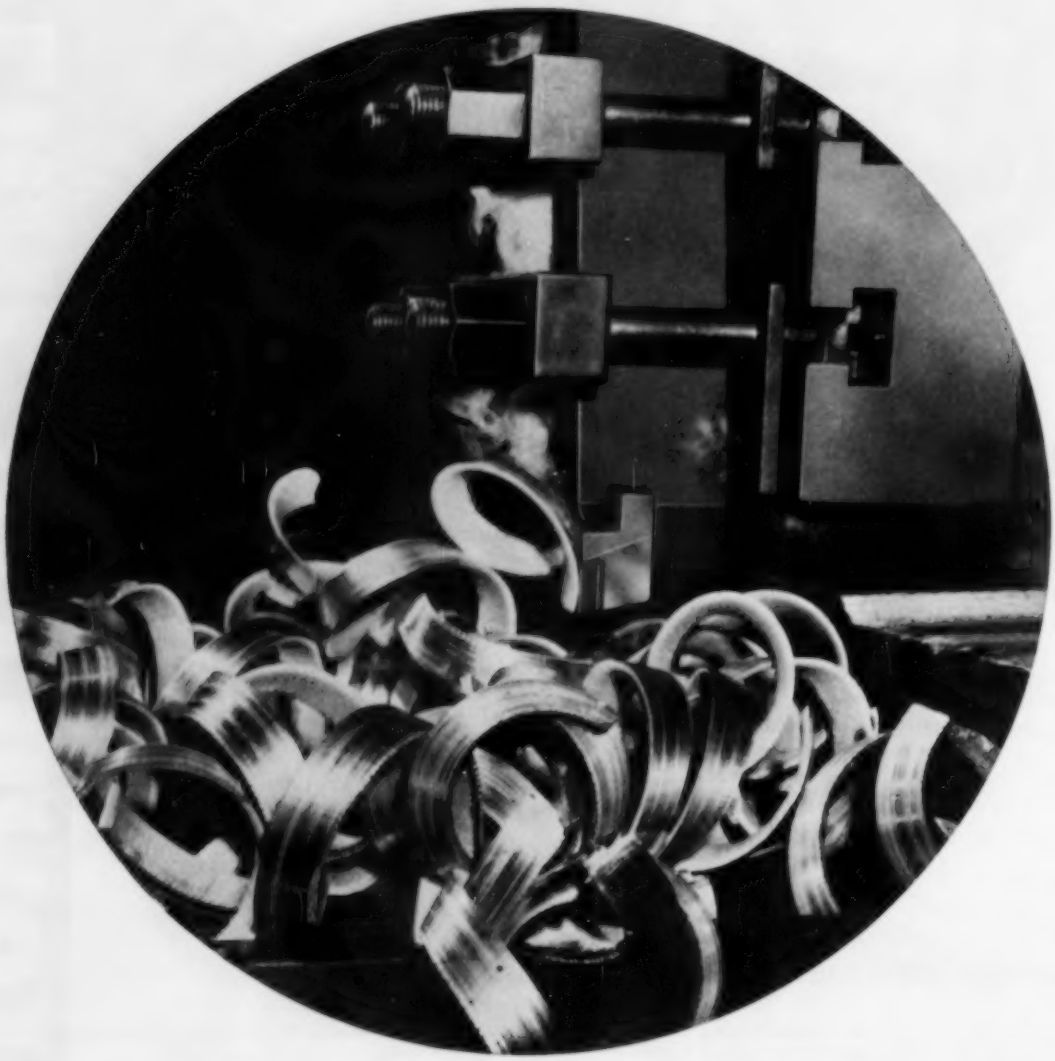
Grefco processing of OLIVE HILL brick entails:

1. Careful selection, testing, stockpiling and blending of fire clays to insure uniform raw material quality.
2. Grinding and screening to prescribed formula to promote high density of product.
3. Efficient deairing during brick forming, also to promote density and proper physical structure.
4. Careful firing to exacting temperature schedules to yield uniform high quality brick.
5. Close inspection of final product with gauging and sorting of brick to close size tolerance.
6. Quality control by statistical analysis procedures for the manufacturing processes.

In service, OLIVE HILL blast furnace brick, both BF and HI-FIRED, have produced many splendid performance records in the past. OLIVE HILL linings in presently operating furnaces, are giving outstanding performance and are more than meeting the increasing requirements of the expanding American Iron and Steel Industry.

GENERAL REFRACTORIES

speeds for carbides**plus** heavy-cut efficiency



low range to 100 fpm . . . for extreme depths of cut and maximum feeds

medium range to 150 fpm . . . for average cuts in medium steel or cast iron

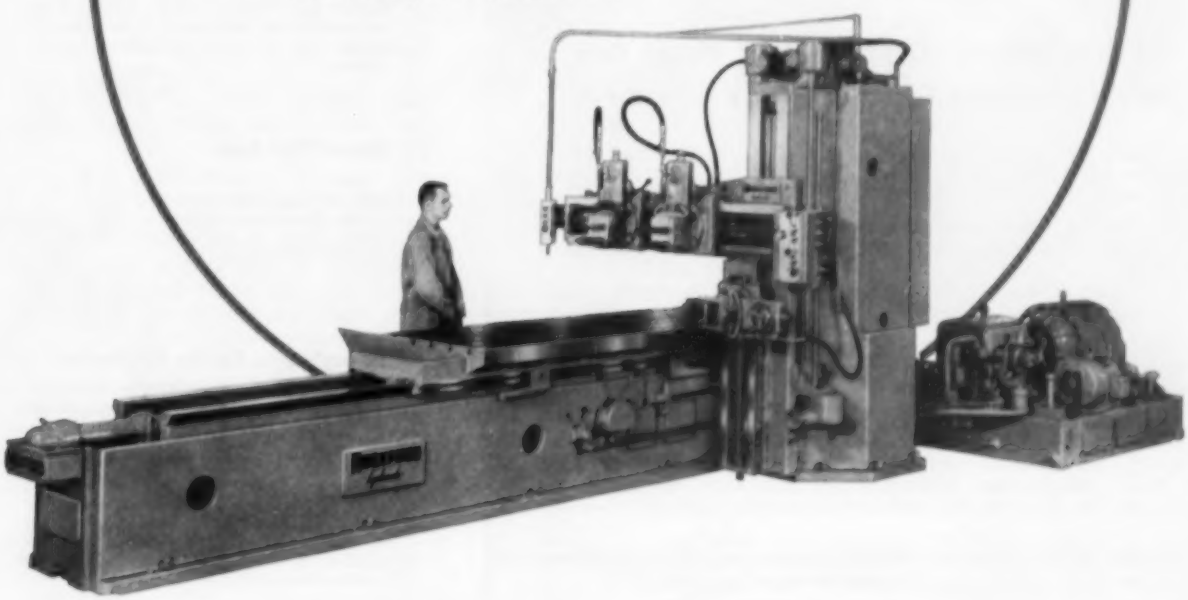
high range to 300 fpm . . . for carbide planing of steel and non-ferrous metals

with triple circuit h3 drive

The new heavy duty Model OGN Hydraulic Shaper-Planers are equipped with triple circuit h3 drive to combine the ruggedness and cutting efficiency of single circu't planers, with the speeds required for carbide planing. Three distinct ranges of cutting speed are provided, with power inversely proportional, to give the correct combination of speed and force to most economically machine any metal.

Hydraulic drive is ideally suited for carbide tooling, since optimum cutting speeds can instantly be set for any tool. Tools also enter the cut more smoothly with hydraulic drive to reduce the tendency for fracturing brittle carbide tips.

A Rockford Machine Tool Co. representative can demonstrate these advantages for you. Ask your local dealer for full details, or write us for a copy of Bulletin No. 1200.



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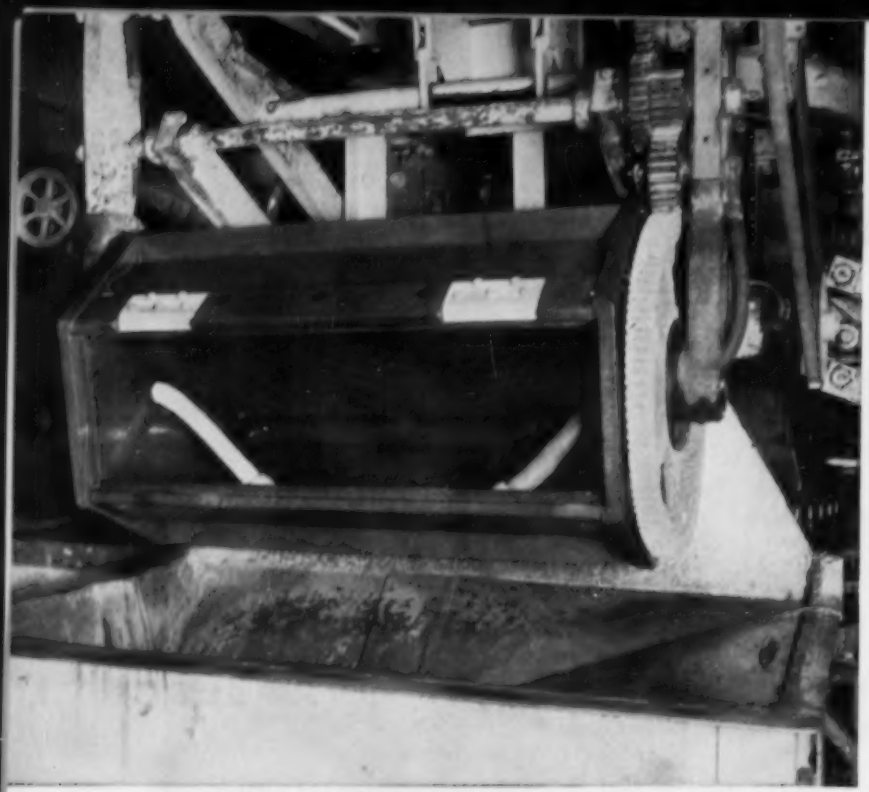

THE BEST BARREL CYLINDER EVER MADE

After 13 Months Of Three-Shift Usage This Udylite Tempron Cylinder Shows Little Wear

This unretouched photograph shows a Udylite Tempron Barrel Cylinder which has been in use for thirteen months, most of the time in a "round the clock" operation. This cylinder looks like new.

Seams are tight and there is no warping although it has processed thousands of heavy loads of work through a complete cycle of *electroclean, acid pickle, zinc plate, bright dip* or *dichromate* and *hot* and *cold rinses.* Most of these loads have been beyond our guarantee of 200 pounds per 14" x 30" cylinder.

In January, 1955 and after two years of exhaustive tests, Udylite formally introduced the Tempron Barrel Cylinder as the most efficient and long lived plating barrel ever offered. The vitality of Tempron and the durability of Udylite construction has now been convincingly proven in hundreds of operations.

During a recent twelve month period, a set of Udylite Tempron Barrel Cylinders has processed millions of pounds of work, mostly through the complete zinc cycle. Any measurement of wear is almost impossible.

Udylite Tempron Cylinders withstand, even under load, the highest temperatures used in plating. Withstand stronger acids. Have greater resistance to abrasion and can be used through the entire plating cycle.

Let us tell you more of the advantages of Udylite Tempron Cylinders or show you "on the job" examples. Write us today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

LETTERS TO THE EDITORS

Wiremen Seek More Info

Please send me ten copies of your article in the Aug. 20 issue (page 76) titled, "How To Sell Yourself to the Mill." I have been writing a monthly bulletin for the Woven Wire Products Association and pointed out the article to its members. Since then, I have had requests for copies.

George Martinek
Western Wire & Iron Works Inc.
Chicago

Metal Selector 'Valuable' Aid

We are enclosing our check to cover the cost of 25 copies of the Metal Selector which appears in the Oct. 1 issue of STEEL (opposite page 162). The publication of such information in tabular form represents the rendering of a valuable service by you to the metalworking industries.

Charles W. East
Charles East & Co.
St. Louis

Never Too Late

Although it is rather late, is it possible to have two copies of the article, "New Technique: Lead in Steel Forgings" (Aug. 13, page 100)? We found it most interesting.

D. V. Bacon
J. T. Coutts & Co. Ltd.
Vancouver, B. C.
Canada

Paraplegics To Be Motivated

Please forward ten copies of "Motivating Men To Produce More" (Sept. 24, page 105) to me as soon as possible.

I have read several books on humanics and every article on the subject that has come across my desk. I must say that this is the best discussion I have ever had the pleasure of reading, and I intend to give a copy of it to each of my group leaders to read, learn and, I hope, to understand.

George Booth
Plant Superintendent
Paraplegics Mfg. Co. Inc.
Franklin Park, Ill.

Please send me a copy.

James A. Roemer
President
Mallory-Sharon Titanium Corp.
Niles, O.

I have just finished reading this article. It was so well written and timely that I would like to know more. In next to the closing paragraph of the ar-

(Please turn to page 12)

"Tumblex* 'T' has a definite place in our tumbling department"...

Leading pump manufacturer lists benefits gained from Norton ALUNDUM TUMBLEX 'T' abrasive*

The executive we're quoting based his decision on parts difficult to deburr with his previous tumbling abrasive. Test runs with Tumblex "T" abrasive, the new Norton bonded, triangular shaped tumbling abrasive, gave him these results:

Part A — 100% increase in barrel payload and 80% reduction in tumbling time. A sandblast operation eliminated and hand deburring reduced about 75%.

Part B — Barrel production increased 20%, tumbling time reduced 25%.

Part C — Barrel production increased 25%, tumbling time reduced 50%.

Part D — Sixteen hours hand deburring saved per 1000 parts.

Tumblex "T" abrasive is one of the most revolutionary tumbling abrasives ever developed. Everything about it is designed for better barrel finishing.

Its uniform triangular shape and size prevents wedging in recesses . . . Made of famous bonded ALUNDUM abrasive, it cuts fast, with no cutting compound needed . . . It provides maximum surface contact with parts being processed, for shorter cycles and larger payloads . . . It wears evenly, and when worn down can be used on parts requiring a smaller abrasive . . . Its lightness means less weight required to fill the barrel.

Results are more uniform finish, shorter time cycles and lower costs per piece finished.

Send For Work Samples

to our Sample Processing Department. Let us prove to you how the latest barrel finishing equipment and techniques can add the "Touch of Gold" that improves product quality and cuts finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

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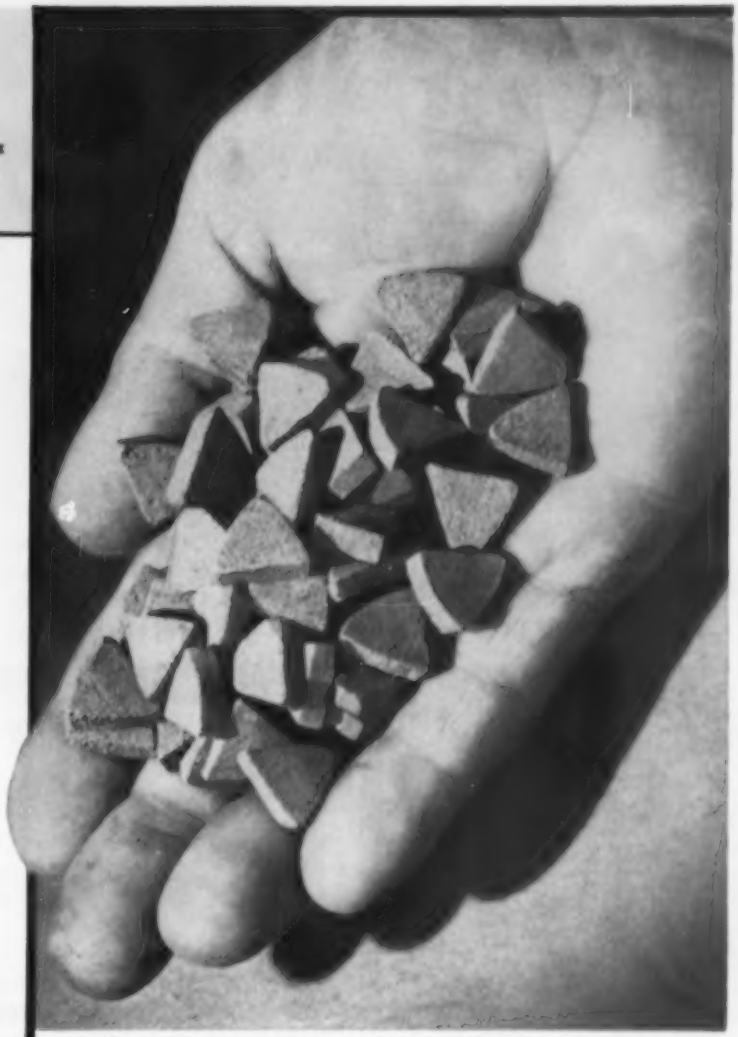

TUMBLEX "T" ABRASIVE brings three big advantages to barrel-finishing: non-wedging triangular shape; fast-cutting bonded ALUNDUM abrasive; long, even wear. Especially effective on intricate-shaped parts. Available in four sizes.

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BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cut Tapes

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

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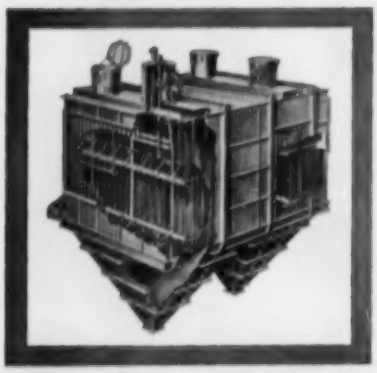
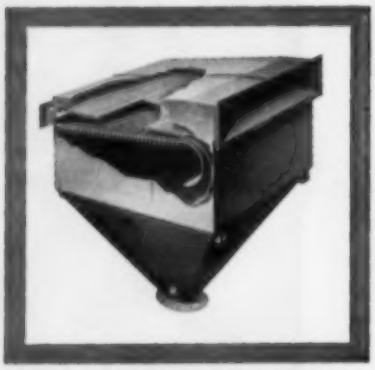
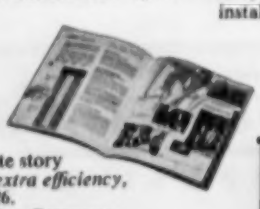
In any cyclone dust collector there is an upward eddy preventing the separation and dropping-out of a percentage of particles. But in Buell Cyclones, the exclusive Buell shave-off design *harnesses* this up-flow—puts it to work! Result: extra efficiency without extra operating cost!



SF Electric Precipitator, a Buell exclusive, also delivers *extra efficiency* due to unique Spiralectrodes and continuous cycle rapping.



Buell's Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for either natural or forced draft installations.



For the complete story behind Buell's *extra efficiency*, write Dept B-26. Buell Engineering Company, 70 Pine Street, New York 5, N. Y.

buell

MECHANICAL ELECTRICAL

Experts at delivering Extra Efficiency in

DUST COLLECTION SYSTEMS

LETTERS

(Concluded from page 10)

ticle (page 112), a new book by Mr. Lawrence A. Appley, president of the American Management Association, is mentioned. Its title: *Management in Action.* Could you forward the necessary information so that I can order the book from the publisher?

A. L. Howell
Works Manager
Baltimore Division
Revere Copper & Brass Inc.
Baltimore

• *Mr. Appley's book may be obtained from the American Management Association, 1515 Broadway, Times Square, New York 36, N. Y.*

Train Distributors To Sell

Your article, "19,000 Sellers for Hire" (July 30, page 59), makes mention of the distributor sales training program of the Boston Gear Works, as described in your July 16 issue.

Are tear sheets of the Boston Gear article available? If so, I would appreciate receiving three copies.

John P. Sullivan
Cooney & Connor Inc.
Worcester, Mass.

• *Copies of the July 16 article, "Help Distributors To Sell" (page 86), are being forwarded.*

Descriptive and Educational

I have read a portion of your article on "Brazing with Silver Alloys." The information is most descriptive and educational.

Would you kindly mail a copy of the article, consisting of the three parts: "Brazing with Silver Alloys" (June 25, page 80); "The Why of Flux" (July 2, page 80); and "Fluxing Techniques" (July 9, page 99).

E. L. Richards
Control Apparatus Section
Standard Control Engineering
Westinghouse Electric Corp.
Beaver, Pa.

Pioneers of Cored Forgings

I was pleased and interested to read your article, "Holes Forged In" (July 2, page 67), which is No. 2 in your Production Ideas series.

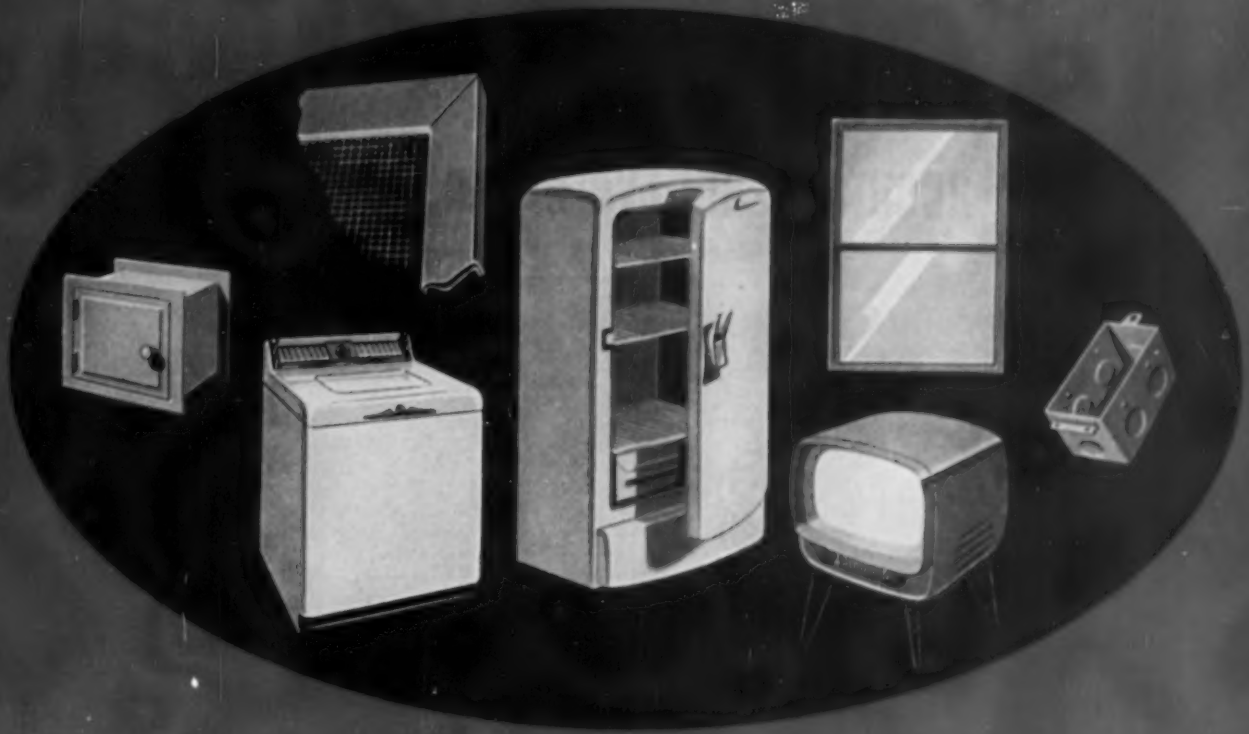
I feel I should not let the occasion pass without pointing out to you that our company was the first to develop this process, and we are considered the pioneers.

For a brief while, the writer considered that he had invented the process but was disillusioned some time in 1950 when he discovered it had been invented many years ago in Great Britain. We went to Great Britain, hired people who knew the process, purchased necessary machines and set ourselves up accordingly.

I am enclosing literature justifying our claim. I thought you would like to note it to amplify the last two lines of your article in which you do give credit to some Canadian companies.

Walter H. Irwin
Vice President
Canada Metal Co. Ltd.
Toronto
Canada

in the long run, galvanized steel . . .



in the longer run, WEIRKOTE

More and more, Weirkote is proving itself to manufacturers of a wide variety of products—under the sternest tests—as a galvanized steel that goes far beyond ordinary galvanized steels.

A special continuous galvanizing process is quality-controlled all the way to make Weirkote withstand the severest stresses of fabrication. Its tightly bonded zinc coat resists cracking, peeling, flaking; resists corrosion for *moisture cannot penetrate to attack the steel underneath.*

And Weirkote's greater strength, rigidity and heat-resistance provide longer life with little or no maintenance.

So for durability, economy, appearance . . . in the *longer run,* Weirkote is your best buy. Put it to work now improving your product . . . *and* your profits!

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WEIRTON, WEST VIRGINIA
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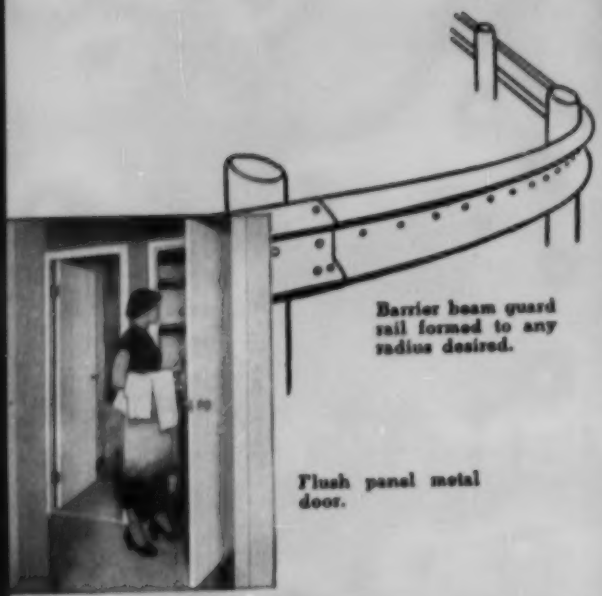
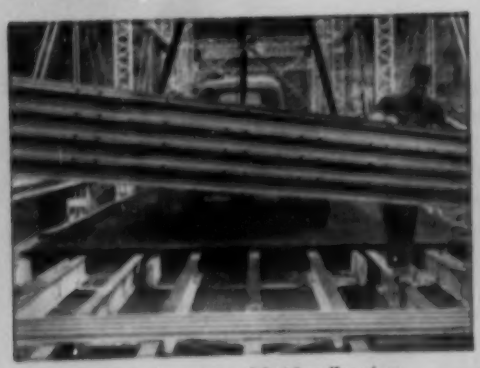
is giving accurate and versatile performance at

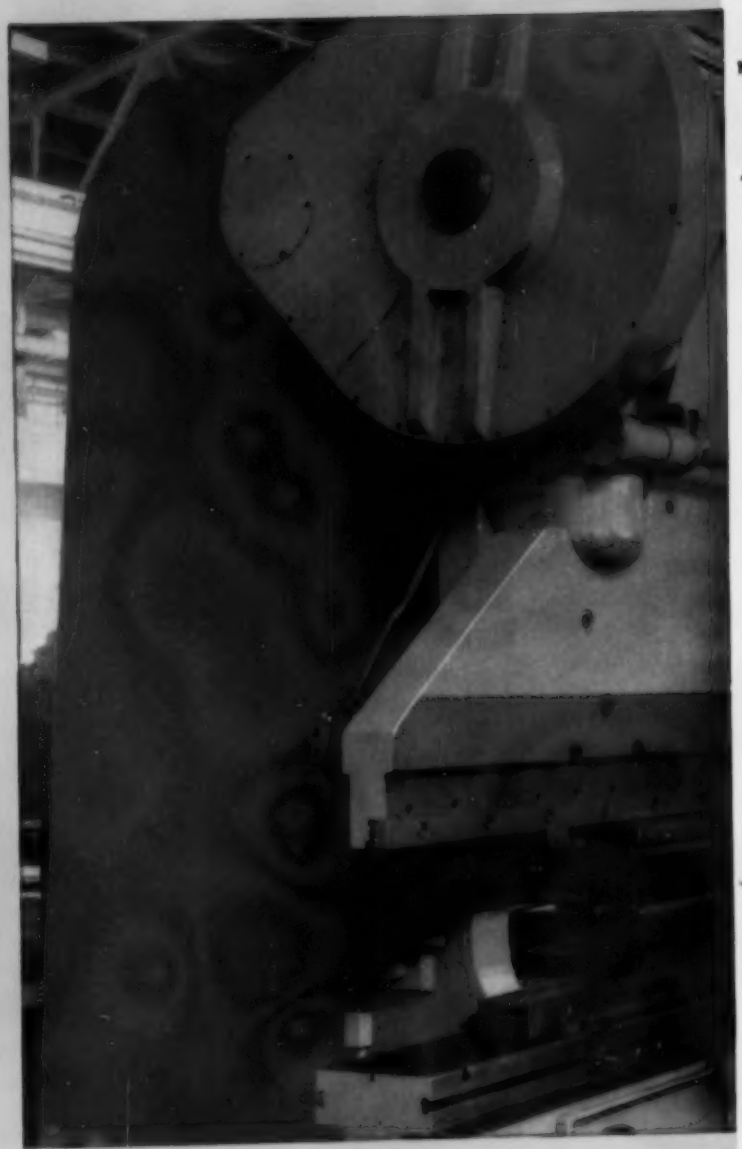


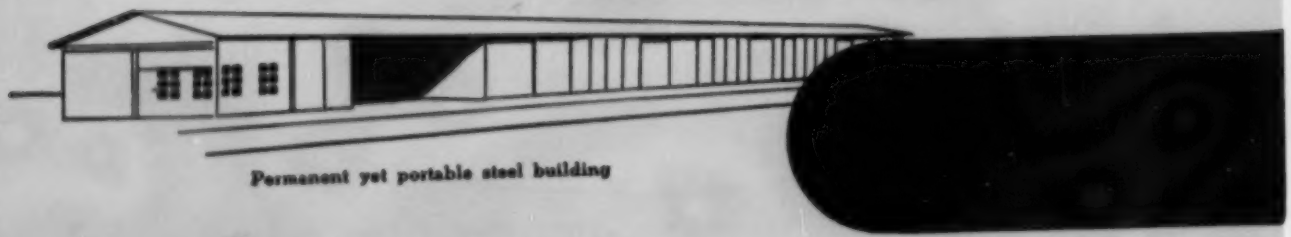
Barrier beam guard rail formed to any radius desired.

Flush panel metal door.



Formed structural bridge flooring

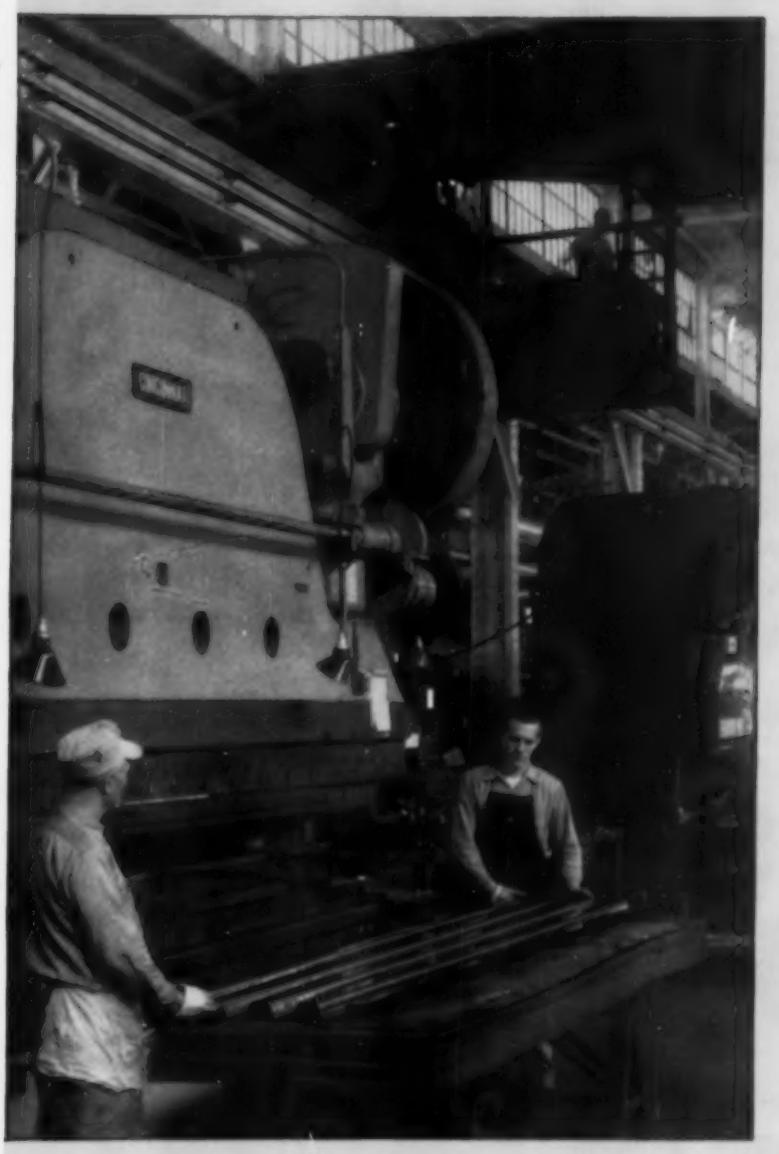




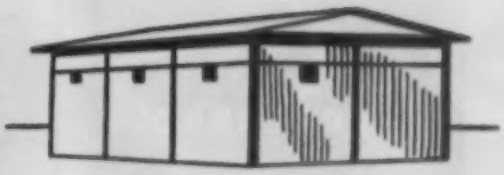
Permanent yet portable steel building

PRESS BRAKE

UNITED STEEL FABRICATORS, Inc.



Photos courtesy of United Steel Fabricators, Inc., Wooster, Ohio



All steel buildings of a thousand uses

WITH ample capacity, this powerful 50 Series Cincinnati Press Brake with 18' 6" clearance between housings and 22' die area—handles formed structural bridge flooring, guard rails, steel doors. Girders and side walls for various types of metal buildings are also produced. United Steel Fabricators, Inc. are pleased with the accuracy in forming and ease and speed of operation which are important factors in this economical production.

INVESTIGATE:

—Cincinnati Center Line Loading

—Cincinnati Interlocked Construction

—Cincinnati Rigid Deep Beds and Rams

Write for the latest Press Brake Catalog B-4.

THE CINCINNATI SHAPER CO.

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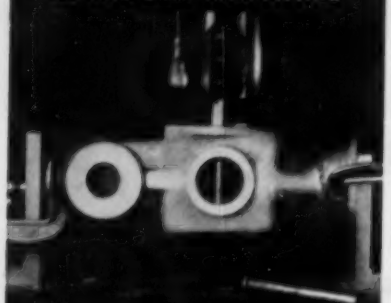
CINCINNATI

33% DECREASE IN DIE WEAR ON THIS GRAY IRON FITTING



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Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer-grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

FOR FREE BOOKLET on FERROCARBO, citing actual case histories of faster machining, with longer tool life, write The Carborundum Company, Dept. 55, Niagara Falls, N.Y. 90-55

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YOU?

They have such refined and delicate palates
that they can discover no one worthy of their ballots,
and then when someone terrible gets elected,
they say, "There, that's just what I expected!"
—Ogden Nash

GET READY, by being registered.
GET SET, by knowing what you're voting for. Then—GO VOTE!

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MATTISON
HIGH-POWERED
PRECISION

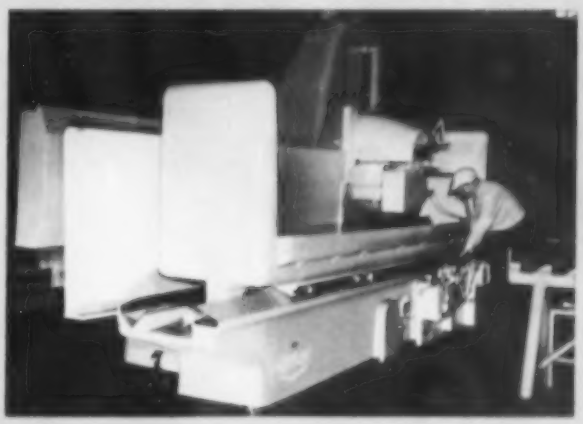
IF IT'S A FLAT SURFACE
THERE'S A MATTISON
TO GRIND IT!

GRINDING METHODS

For high-precision, high-production, or both... grind it on the Mattison! Here is an example of how Mattison Horizontal Spindle Surface Grinders are used wherever close tolerances are needed—in both high-production and general-purpose machining.

Above, WARPLIS precision ground flat stock is ground at a high rate of production to a standard thickness tolerance of plus or minus .001 in., with many special runs requiring a total tolerance of .0005 in. Precision tolerances are easily held on a Mattison —a machine that is built to handle small or large parts, with stock removal rates you never thought possible on a surface grinder.

The machine at the right is used for general-purpose machining in a large railroad shop. No costly fixtures are needed to accommodate the wide variety of work required. Stock is "hogged off" at surprising speed, with virtually no setup time between jobs. This versatility is the reason many manufacturers are switching from lighter machines and other machining methods to high-powered surface grinding.



• Mattison grinders are used to machine inside and outside surfaces of multiple guards for steam locomotives, as well as for grinding guide bars and miscellaneous parts for diesel motors, shear blades, and hardened steel dies.

SWITCH FROM PLANER TO MATTISON FACE GRINDER BOOSTS PRODUCTION OF BRAKE BASES 200 TO 300 PER CENT

Accuracy and finish upgraded on the Mattison "UK"

• Large cast steel brake bases, formerly machined on a planer, are finished three to four times as fast and more efficiently on this Mattison "UK" Traveling Wheel Face Grinder.

Surface finish has been improved considerably, and it is now easier to machine the brake bases to desired limits of accuracy. The machine is so simple to operate and easy to set up, operator skill requirements have been reduced on this job with resultant savings in direct costs.

At this plant, many jobs formerly done on a planer or milling machine are now being machined faster and more efficiently on the Mattison "UK". The large traveling wheel—feeding at the end of each stroke—covers the entire work surface on each pass. All cuts are finishing cuts, whereas first operations on the planer or milling machine had to be roughing cuts. As a result, it is now easier to machine the parts to specified tolerances.

• Mr. Schaffer, A. M. Castle Grinding Service, can use his Mattison "No. 36" continuously because the wheelhead is so easy to adjust. The machine can cut a convex or concave surface, and then be reset in a matter of minutes to grind flat and parallel work.

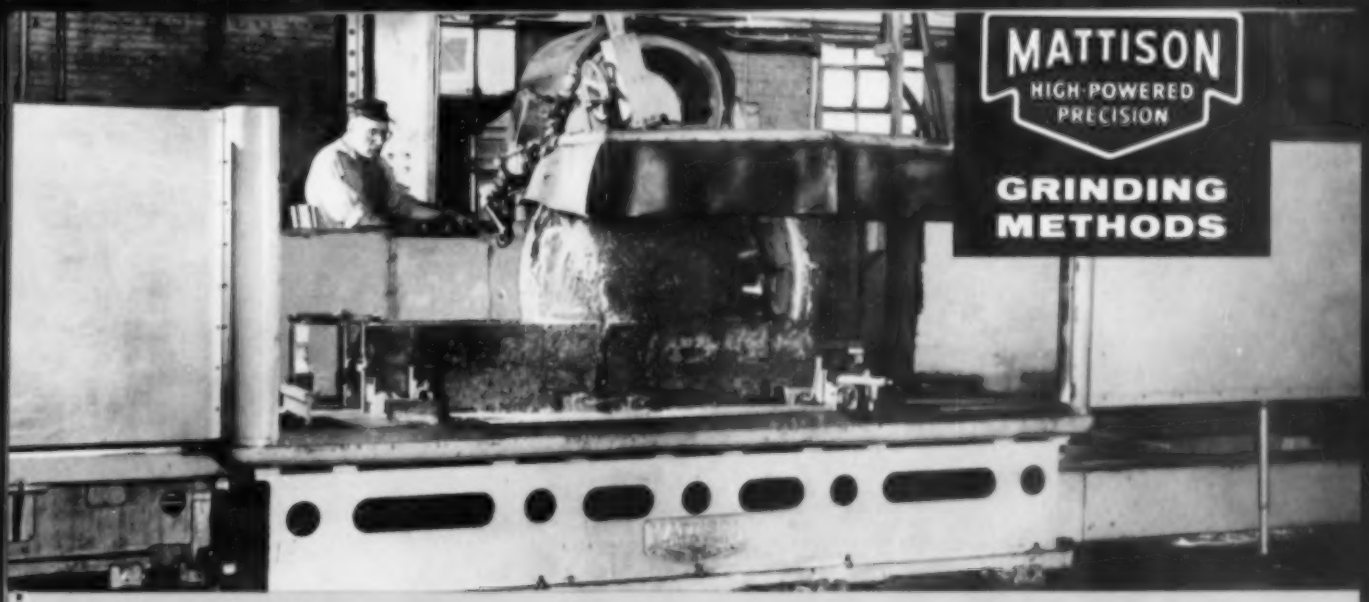
"Our Mattison cut manhours in half . . . paid for itself in only a few months!"

• "With this machine, we can beat any comparable piece of equipment for metal removal," reports A. M. Castle Grinding Service, Los Angeles.

"Its ruggedness, ease of operation, and efficiency save us time and money. The machine cut our manhours just about in half, and paid for itself in a matter of a few months."

This machine is used for subcontract grinding, which requires fast stock removal, easy adjustment, high precision, and wide work range. These demands are easily met, because Mattison's extra-heavy and rigid construction permits the use of high horsepower (in this case, a 50 hp spindle motor). This extra power produces high unit pressures for grinding large surfaces, and assures positive free-cutting action.

Investigate the new features Mattison has added to its line of rotary surface grinders, including the new, heavier Meehanite base, new continuous down feed, improved protection for column ways, and two optional automatic sizing and cycling systems.



Traveling wheel design accommodates over-length parts!

• The entire length of extra-long or heavy parts can be ground quickly to close tolerances on a Mattison "UK" Traveling Wheel Face Grinder that occupies little more than *half* the floor space required for traveling table machines of equal capacity. One end of the work is supported by the stationary work table, the other end by supplemental blocking. Mounted on a slide with long, wide ways, the grinding wheel head can be fed by hand or automatically in steps of .0005 in. to .003 in. The carriage bears it across the entire work surface each trip. The operator's position on the carriage, together with the convenient grouping of controls, permits fast, accurate production regardless of the size of the part. If you want to machine the ends of long castings, structural steel beams, rails, steel plates, and similar large parts, the Mattison Type "UK" Traveling Wheel Face Grinder will be a profitable investment for you. Write for complete facts in Bulletin 844-2.

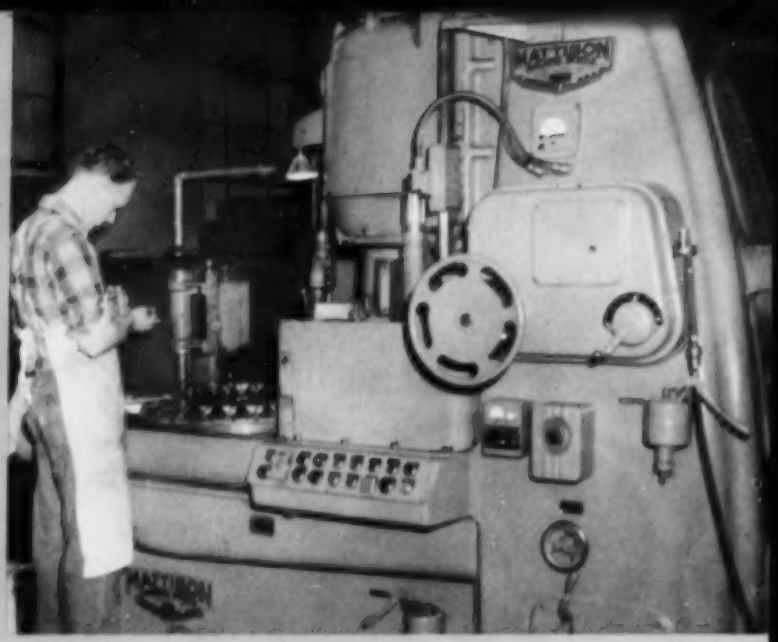
Holds 4 ends square, parallel, and to size, at high-production rate!

• Precision, low-cost production of Universal Joint Spiders was made possible by this Mattison Model 221 Double Disc Grinder. Operation calls for grinding four ends of spiders measuring 7¾ in. over ground surfaces, at a high rate of production and with stock removal of .010 in. Opposite ends of these parts must be ground square with the trunnion diameter and parallel to each other. They are held in "V" fixtures with swiveling "U" blocks and fed through the Mattison on a rotary drum-type feed mechanism, which is manually loaded and unloaded. Automatic work sizer feeds the grinding wheel heads independently, compensating for wheel wear. Automatic feed increments can be as small as .0001 in.

Mattison Disc Grinders offer a low-cost method for machining opposed surfaces and thin-walled parts to extremely close tolerances. Three types of feed are available, including oscillating feeds, hand or power operated; rotary fixtures (like the one illustrated); and straight through feed for highest production jobs.

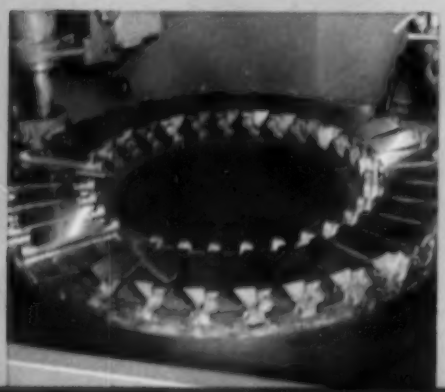
• Universal Joint Spiders (No. 8620 steel) are ground on four ends, holding size within .001 in. Mattison builds these high-production disc grinders in five sizes, ranging from 10 to 30 in. disc wheel capacity, with 1½ to 50 hp spindle motors.

CHANGE TO SURFACE GRINDING—CUTS COST PER FINISHED PIECE FROM 31¢ TO ONLY 9¢!



• These chain links formerly were milled at the rate of 100 every three hours, using high-speed steel cutters. Eighteen pieces were produced between sharpenings. At 35 minutes per sharpening, 3.2 hours of cutter maintenance were required for every three hours of production, with a labor cost of $16. This, plus a machining cost of 15¢ per piece, resulted in a total cost of 31¢ per piece to mill.

Today, links are ground at the rate of 100 pieces per hour on the Mattison No. 24 Automatic Cycling Vertical Spindle Surface Grinder. Powered by a 40 hp spindle motor, the machine removes .140 in. of stock at .016 in. minimum down feed per minute. Wheel cost is only 4¢ per piece, and cutter maintenance is eliminated (wheel is self-dressing). With a labor and machine cost of 5¢ per piece, total cost to grind is only 9¢—a saving of more than 22¢ per piece . . . plus additional savings in cost of milling cutters.



Left, 30 of these 4140 drop-forged chain links are ground in one operation. The automatic sizer gauges the parts continuously and stops the automatic cycle when finish size is reached. Mattison's new *continuous down feed* makes it easy to hold close limits. And, there is no restriction on the feed rate because of linkage actuation. If you are machining large or small flat surfaces in long or short production runs, and you want to reduce cutting tool and material costs, eliminate rejects, or simplify setup and handling of work, why not let Mattison grind your parts and demonstrate improvements made possible by high-powered surface grinding!

IF IT'S A FLAT SURFACE . . . THERE'S A MATTISON TO GRIND IT!

SEND US YOUR PARTS FOR FREE DEMONSTRATION GRIND!

• The Mattison Methods Laboratory, equipped with all major types of modern surface grinders, face grinders, and disc grinders, introduces a new service to metalworking plants. You are invited to submit parts for sample grinds and production estimates. Please include part prints, operation or route sheets, and all special requirements for machining your pieceparts. You'll get a comprehensive and reliable report based on close duplication of field conditions.

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ROCKFORD, ILL., U.S.A.

HIGH-POWERED
PRECISION
SURFACE
GRINDERS

MATTISON MACHINE WORKS
ROCKFORD, ILLINOIS

New aluminized safety clothing reflects 90% of radiated heat!

Lightweight garments protect men against 2100° F. heat... let you cut furnace downtime up to 75%!

No more lost profit for your mill when new "3M" Aluminized Fabric safety garments are on the job.

This new safety clothing *reflects* heat . . . doesn't merely insulate against it! It can take far higher temperature exposures than the bulky, heavier old style clothing. Because it turns back up to 90% of radiated heat, you don't have to shut down for repairs . . . Men wearing this new lightweight clothing have changed the doors on ingot reheating furnaces with the furnace operating at 2100° F.

Work that used to take days now can be done in hours!

Men *like* to wear it, too. It's light, comfortable, flexible . . . easy to work in. And it lasts up to 50% longer than conventional garments. Aluminized asbestos fabric *sheds* molten splash . . . doesn't burn. A complete range—gloves, aprons, suits, helmets, etc.—is available.

Get the money-saving facts on new 3M Brand Aluminized Fabric now. Send coupon today for data and FREE sample.

3M Brand Aluminized Fabric Garments are available from leading safety clothing manufacturers.

Aluminized Fabric

3M COMPANY

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Please send complete details and free sample of new "3M" Brand Aluminized Fabric.

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America's oldest, leading shear

the most in accuracy, speed

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POWER SQUARING SHEARS

builder offers you

and thrifty performance

One of the greatest values of a Niagara Power Squaring Shear is the unequaled experience of its builder. Niagara has been making shears for more than three quarters of a century.

Today, as in the past, the oldest leading name in shears stands also for the most modern in shear design. Niagara has continually set the pace in offering the most of **things which count the most** in dependable shear performance.

YOU GET THE MOST IN ACCURACY:

- With the cutting line fully visible, the positive power actuated, self-compensating holddown grips work securely. Multiple pressure feet on 6" centers apply uniform pressure, contacting the work with low impact to safeguard material and bed against damage. Long or short work is held tight against the bed. There's no rippling of the sheet as the keen edged, low-sloped upper knife shears through . . . clean and smooth.
- Niagara's fully closed box section construction of bed, crosshead, holddown and housings plus ample and accurately held crosshead guides resist horizontal, vertical and torsional stresses with minimum deflection.
- Edges are trimmed straight and true within micrometer tolerances. Blanks, too, are cut accurately to size and shape without making compensating allowances when setting gages. Only a Niagara Shear possesses **all** of the necessary features to insure maximum accuracy!

YOU GET THE MOST IN SPEED:

- More working strokes delivered per minute and instant engagement of the Niagara Sleeve Clutch assure more cuts per hour. In continuous feed shearing, quick release of the power driven holddown enables a strip to be cut at each stroke.
- There's no need to adjust knife clearance every time a different thickness of stock is cut. Individual holddown feet are self-compensating. Two sheets of different thicknesses can be cut at the same time with the same knife adjustment and with the same accuracy.
- Ease of operation, quick setting gages and confidence inspired by safety features further increase hourly output . . . and make a Niagara Shear a truly productive, profitable investment for you!

YOU GET THE MOST IN THRIFTY PERFORMANCE:

- Simplicity of design, involving a minimum number of parts, cuts out costly maintenance. With less to go wrong, there's less to repair and replace.
- Vital parts of Niagara's driving mechanism (clutch, gearing, flywheel, eccentrics and detent) operate in enclosed oil-tight cases. Ideal lubrication and maximum safety are thus insured.
- With power transmitted from the drive through efficient spur gears and Niagara's instant engaging, multiple-point sleeve clutch, there are no sliding surfaces (such as in worm gears and friction clutches) to consume power, generate heat and wear rapidly.
- Niagara 4-cutting-edge knives, manufactured entirely within the Niagara plant, are uniformly tough to withstand hard usage and are promptly available.

Niagara Shears at work in Ohio plant of one of the major electrical appliance manufacturers.

MOST EXACTLY SUITED TO YOUR NEEDS, TOO!

To fit your requirements exactly, consult a Niagara representative. With over 7 dozen models available in capacities from shim stock to 1" mild steel and in cutting lengths from 3 to 24 ft., he'll be able to recommend the shear that's **right** for you.

ILLUSTRATED, FACT-FILLED BULLETIN 69 MAILED FREE ON REQUEST

It will give you detailed information on the complete, modern line of Niagara Underdrive Squaring Shears. Write for your copy today.

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A New and Better Chrome Carbide

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BETTER RESULTS

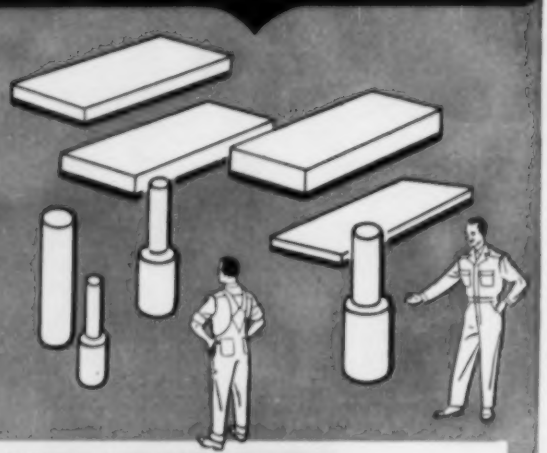
BETTER DIE LIFE
because of . . . High resistance to oxidation at elevated temperatures.

BETTER SIZE CONTROL
because of . . . Excellent wearability.

BETTER BAR FINISH
because of . . . High hot hardness.

LESS PICKUP AND GALLING
because of . . . Less affinity towards other metals.

FOR PRECISION GAGING



BETTER RESULTS

MORE ACCURATE GAGING
because of . . . Coefficient of expansion close to that of steel.

EXCELLENT SURFACE FINISH
because of . . . Low porosity.

EASY MAINTENANCE
because of . . . High resistance to corrosion.

LONGER GAGE LIFE
because of . . . Excellent wearability.

Write for the NEW
CARMET CATALOG

. . . Completely revised, the 16th Edition of the Carmet Catalog contains the latest information on all Carmet grades, and on Carmet blanks, tools, die sections, etc.; also gives details on special preforming and how to order special parts.

Address Dept. 5-821

Now for the first time a completely homogeneous chrome carbide is available . . . Carmet CA-815. Grade CA-815 is ideally suited for such operations as the two illustrated above . . . or for *any* application where resistance to corrosion as well as resistance to abrasion are a factor.

Carmet CA-815 is manufactured under controlled conditions. Die and gage makers are assured of complete dimensional accuracy and excellent surface conditions. Only minimum amounts of stock are left for finishing.

For further information on this and other Carmet carbide grades, call your Carmet Engineer . . . or write *Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Mich.*

W S W 6180

For ALL your CARBIDE needs, call

Allegheny Ludlum

AL
FINE TOOL STEELS
SINCE 1854

Change in Grain Size and Structure Cuts Abrasive Costs 80%

Grizzly Manufacturing Division grinds 5½ times more brake lining per disc

An 80% cut in abrasive disc costs in grinding brake lining is reported from Grizzly Manufacturing Division of Paulding, Ohio.

Looking for ways to cut costs, their production men called in the Gardner Abrasive Specialist. Could Gardner make discs that wouldn't wear out so quickly?

The new Gardner disc stepped up production from 454,790 to 2,512,200 feet of lining per disc. That's 5½ times more production for each disc! Downtime for disc replacement has been turned into productive time.

GARDNER

abrasive discs

BELOIT, WISCONSIN, U.S.A.

Multiple sources for "Things" not called SPRINGS

Yours to put to work . . . . our mechanical ingenuity and craftsmanship . . . . experienced in producing an infinite variety of metal parts in such fields as automation, communication, medical, electronics, safety devices, product development, etc. The capacity of ASC springmaking minds and machines is unlimited. Ask any Division to examine your sample or blueprint.

DIVISIONS OF ASSOCIATED SPRING CORPORATION — COAST TO COAST

- WALLACE BARNES COMPANY — BRISTOL, CONNECTICUT
- THE WILLIAM D. GIBSON COMPANY — 1990 OLYBOURN AVE. CHICAGO 14
- RAYMOND Manufacturing COMPANY — CORRY, PENNSYLVANIA
- BARNES-GIBSON-RAYMOND — 40300 PLYMOUTH RD. PLYMOUTH, MICH.
- B-G-R COOK PLANT — ANN ARBOR MICHIGAN
- SEABOARD Coil Spring Div. — 15001 S. BROADWAY GARDENA, CALIF.
- OHIO DIVISION — 1825 EAST FIRST ST. DAYTON, OHIO
- WALLACE BARNES COMPANY — STATE FAIR BLVD. SYRACUSE 9 (Liverpool) N.Y.
- MILWAUKEE DIVISION — 341 S. ERIE ST. MILWAUKEE, WIS.
- DUNBAR BROTHERS COMPANY — BRISTOL, CONN.
- F. N. MANROSS AND SONS CO. — BRISTOL CONNECTICUT
- THE WALLACE BARNES CO., LTD. — HAMILTON CANADA

Divisions of

ASSOCIATED SPRING CORPORATION

CALENDAR
OF MEETINGS

Oct. 15-16, Rail Steel Bar Association: Fall meeting, Sheraton Mt. Royal hotel, Montreal, Que. Association's address: 38 S. Dearborn St., Chicago 3, Ill. Secretary: W. H. Jacobs.

Oct. 15-17, American Gas Association: Annual convention, Haddon Hall and Traymore hotels and Atlantic City Auditorium, Atlantic City, N.J. Association's address: 420 Lexington Ave., New York 17, N.Y. Managing director: C. S. Stackpole.

Oct. 17-19, American Society of Body Engineers Inc.: Annual technical convention, Rackham Memorial Bldg., Detroit. Society's address: 100 Farnsworth, Detroit 2, Mich.

Oct. 18-20, Foundry Equipment Manufacturers Association Inc.: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: One Thomas Circle, Washington 5, D.C. Secretary: C. R. Heller.

Oct. 20-23, Conveyor Equipment Manufacturers Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: One Thomas Circle, Washington 5, D.C. Executive vice president: R. C. Sollenberger.

Oct. 22-23, American Coke & Coal Chemicals Institute: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 711 14th St. N.W., Washington 5, D.C. Secretary: S. S. Robinson.

Oct. 22-24, Systems & Procedures Association of America: International meeting, Bellevue-Stratford hotel, Philadelphia. Information: J. A. MacQueen, general chairman, 1956 International Systems Meeting, Department P, Alan Wood Steel Co., Conshohocken, Pa.

Oct. 22-26, National Industrial Exposition & Management Conferences: Detroit Artillery Armory, Detroit. Information: Denham & Co., 925 Book Bldg., Detroit 26, Mich.

Oct. 22-26, Production Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N.Y.

Oct. 22-25, Society of Industrial Packaging & Materials Handling Engineers: Technical short course and national protective packaging and material handling exposition, Kiel Auditorium, St. Louis. Society's address: 111 W. Jackson Blvd., Chicago 4, Ill. Managing director: Charles J. Carney Jr.

Oct. 23, American Society of Safety Engineers: Annual meeting, Conrad Hilton hotel, Chicago. Society's address: 425 N. Michigan Ave., Chicago. Secretary: J. B. Johnson.

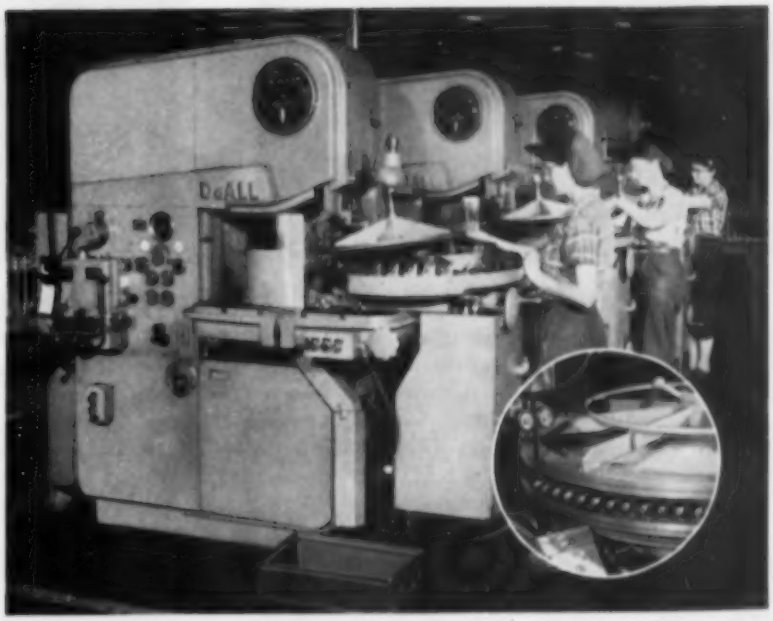
Oct. 24-25, American Society of Mechanical Engineers: Fuels conference, Sheraton-Park hotel, Washington. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: C. E. Davies.

Oct. 25-26, Society for Advancement of Management: Annual fall conference, Hotel Statler, New York. Society's address: 74 Fifth Ave., New York 11, N.Y. Executive vice president: Harold R. Bixler.

Oct. 25-26, American Supply & Machinery Manufacturers' Association Inc.: Industrial distribution forum, William Penn hotel, Pittsburgh. Information: W. B. Thomas, Hunter-Thomas Associates, Cleveland, O.

Oct. 25-26, Drop Forging Association: Fall industry meeting, Biltmore hotel, New York. Association's address: 419 S. Walnut St., Lansing 33, Mich. Secretary: Richard L. Marcus.

Oct. 28-31, American Gear Manufacturers Association: Semiannual meeting, Edgewater Beach hotel, Chicago. Association's address: One Thomas Circle, Washington 5, D.C. Executive secretary: John C. Sears.



Trimming jet engine rotor blades. DoALL band machining offers a new concept of continuous cutting with no restriction to length or contour of the cut.

No Jet Age with Horse and Buggy Tools

It took entirely new concepts and methods to design and build jet engines. Ordinary metals melt at jet engine temperatures . . . or disintegrate at jet engine rotation speeds. Ordinary dimensional tolerances are crude and inadequate. It takes the latest and finest methods and tools to begin to do the job.

Trimming of jet engine rotor blades to desired circumference is a good example.

The job was solved by use of the most recently developed basic machine tool . . . The DoALL Contourmatic band machine. For the rotor trimming job, friction sawing is employed. The machine drives a saw band at 10,000 feet per minute. Frictional heat generated by this high speed softens the rotor blade metal at point of cut. The saw takes 720,000 bites per minute out of the softened metal. An automatic circular fixture feeds the work into the continuously-cutting saw band.

Horse and buggy tools can't do jet age jobs. Industry must invest at an accelerating rate in newer, better tools like the DoALL. About one fifth of the gross national product—everything produced in the country—must be set aside from current consumption and saved each year to provide for the capital facilities upon which production of all wealth depends. Otherwise, America cannot continue to provide a constantly improving standard of living for a constantly growing population.

Reprints available for your employees.

DoALL manufactures basic machines for sawing, grinding and lapping in four modern plants. Ask for Booklet—"How DoALL Products are Made, Sold and Serviced."

The DoALL Company
Des Plaines, Illinois
38 Local Sales-Service Stores E-19

1 Study the editors' background in the industry served

How many editors does the magazine employ? Are they working *full time* on the staff . . . does their education, ability and experience qualify them to write authoritatively, mold opinion, render service? For instance, STEEL points to 33 full time editors with a total of 479 years' experience serving metalworking, exclusively.

2 Check into editorial achievements and performance

Awards for editorial excellency are not important in themselves. But they do indicate the quality, completeness and thought underlying the editorial job. STEEL editors consistently win industry's key editorial honors. For example, over the years, STEEL has captured eighteen "Industrial Marketing" awards for top editorial performance.

7 ways to evaluate the qualifications of the men who edit a business paper

Check for yourself how STEEL editors measure up to the vitally important job of serving fast-moving metalworking. Here is an editorial staff second to none in calibre, experience and ability. It's another reason why STEEL is building on an ever-widening base of faithful readers who rely on what STEEL editors say, week after week. It's another reason why advertising in STEEL carries *more* weight, brings a *greater* return for each dollar invested. (This is another in STEEL's continuing series, "How to Measure Readership of Business Papers". If you would like reprints, drop us a line.)

3 How many have established reputations in the field?

Have staff editors *proved* their right to inform their readers? Does industry ask their counsel? STEEL editors have "hot" 'phones . . . each week they receive countless calls for data and source material. They originate business trend stories for the newspress. Several have written authoritative textbooks on metalworking operations.

4 Do editors keep posted on changing industry needs?

Alert, *service-minded* editors attend association meetings, forums, industrial planning sessions, and other gatherings affecting their industry. STEEL editors, for example, have consistently played an important role in such sessions. Last year they participated in 177 different industrial and trade association meetings across the U. S.

5 Think twice about staff editors who are "travel-shy"

Conscientious editors get off their chairs and into the plants—talk things over with the men they serve—travel thousands of miles every year to feel the pulsebeats of industry. In 1955 the men who edit STEEL traveled a total of 650,000 miles to visit with key executives throughout Metalworking America and in foreign countries.

6 Good editors are called upon to "speak their piece"

Much of an industry's progress stems from an exchange of information at industry group meetings. High-level editors are often called upon to moderate such discussions. Each year STEEL editors address such prominent groups as "American Society for Metals", "American Management Association", "Iron & Steel Engineers", and many others.

7 What experienced editors say makes news—or should

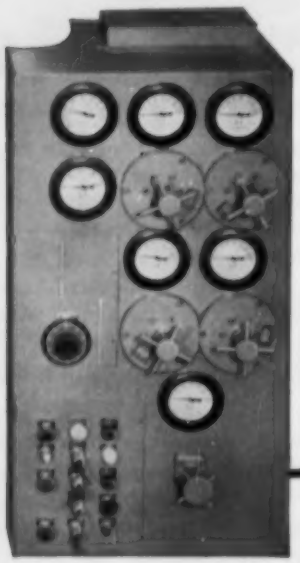
Still another way to measure the stature of an editorial team is to check how often it is quoted. *Each week*, for example, television newscasters, radio commentators and national news columnists dip into STEEL's storehouse of printed information . . . and quote more than 600 separate news items originating in STEEL's editorial content.

A Penton Publication

PENTON BUILDING, CLEVELAND 13, OHIO

Farquhar... the first triple-acting press with electric magnetic controls...

EVERY ADJUSTMENT of speed, timing and pressure is made by the operator on this Control Panel without leaving his operating station. It is no longer necessary for him to climb to the top of the press for this purpose.



...the only press that can do so many things so well

THIS hydraulic press revolutionizes the high speed production of draw-formed parts. We believe that it has rendered obsolete every double-acting and triple-acting press now in service. These are challenging statements... *but read the facts.*

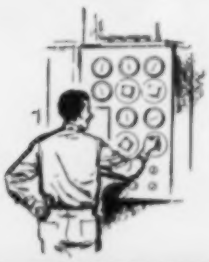
A. B. Farquhar Division, The Oliver Corporation
Press Department, York 53, Pennsylvania

OLIVER

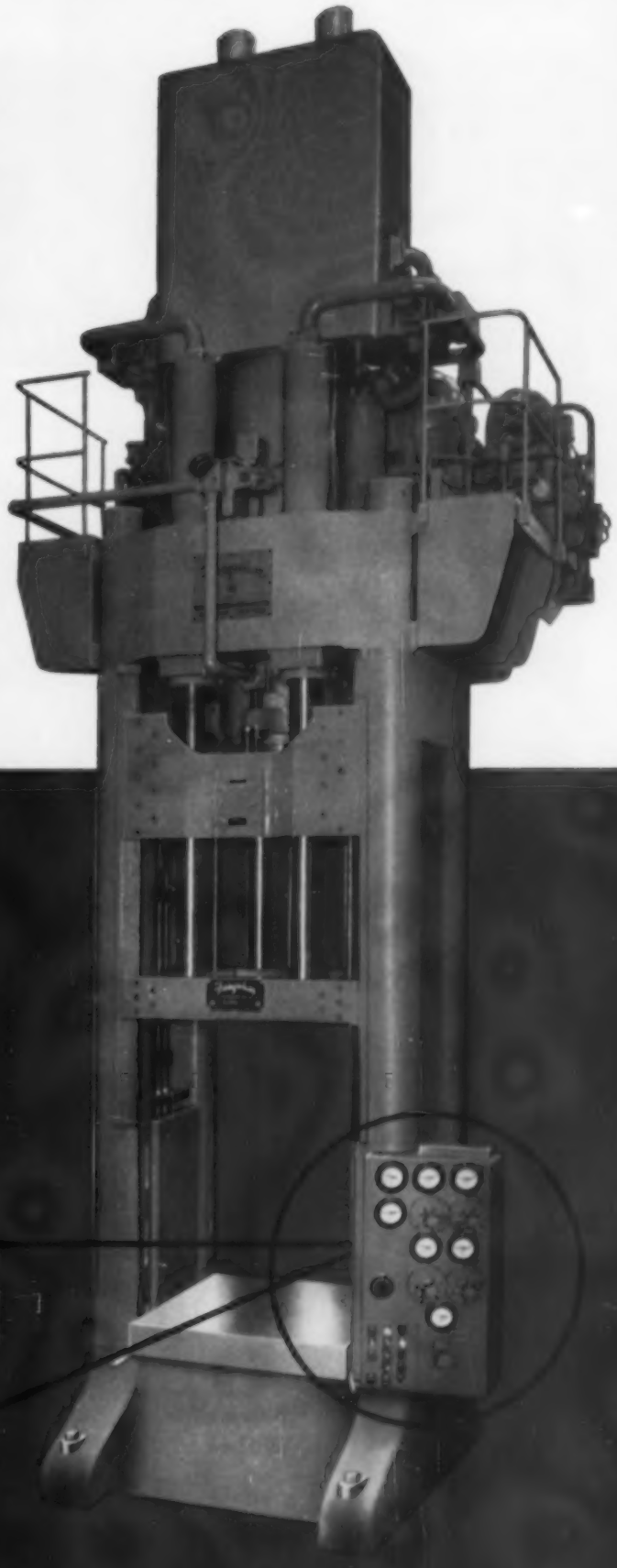
Farquhar PRESSES

DRAWING • FORMING • FORGING • STRAIGHTENING • BENDING

- **Unlimited speed changes** now possible at any point in the cycle. This means, for example, that the ram can approach the draw at maximum speed, slow down as it enters the draw, change speed in the middle of the draw, strip slowly and return to up position at maximum speed.
- **Draw-forming of difficult materials** is thereby greatly simplified and improved. The exact speed can be selected which is best suited to the characteristics of the material at any point in the stroke.
- **Expensive dies** can be given added protection by "gentle" treatment at point of contact and withdrawal.
- **Cycle time is greatly reduced,** because maximum speeds can be attained at every desired point in the cycle.



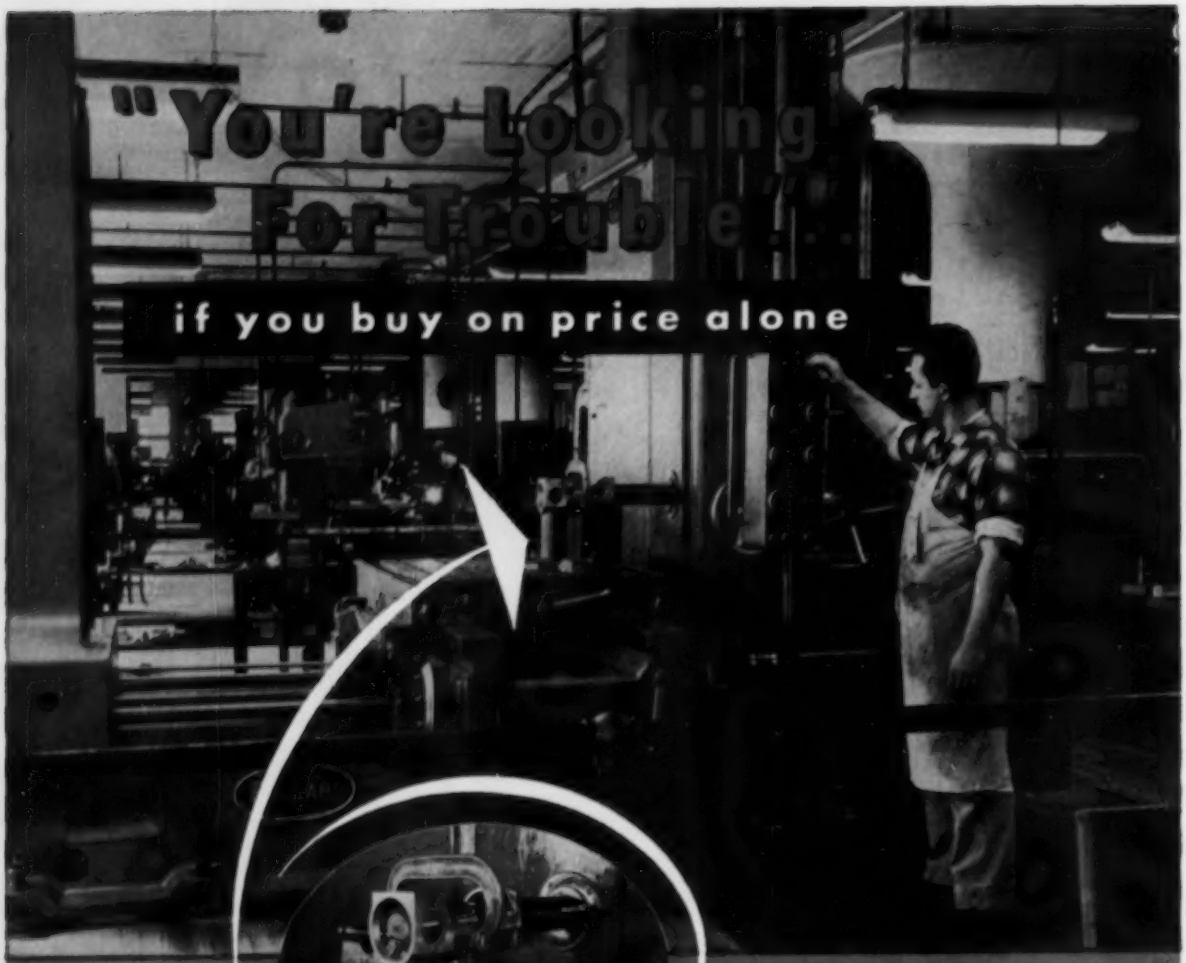
- **No expensive cams** with time-consuming adjustments are needed to obtain these results. All speed changes are made by dial settings on the control panel.



- **4-point adjustment of blank holder pressure** is made by operator without leaving operating station, an important device in the draw-forming of eccentric shapes. This has been a feature of Farquhar Double-Acting Presses in the past. It is an important feature of the new Farquhar Double and Triple-Acting Presses, too.
- **Best of all,** with these additional advantages, the Farquhar Double and Triple-Acting Presses are competitively priced!
- **For a more complete description** of these new Farquhar Presses with electric magnetic controls, write for Bulletin A-200. Please use your company stationery. A. B. Farquhar Division, The Oliver Corporation.

Speeds are pre-set by these radio-type dials which can be located within the main control panel or in a remote position.

FORCING • ASSEMBLING • EXTRUDING • AND OTHER OPERATIONS



BULLARD

"Like many other firms," says Mr. A. Balas, Equipment Engineer at Mergenthaler Linotype Co., N.Y.C., "we are constantly on the alert for new equipment, new processes and new ideas. This constant search for improvement convinced us of the need to purchase a versatile, time-saving, cost-saving and, above all, accurate Horizontal Boring Machine. We checked them all — feature for feature — and then bought the Bullard H.B.M., Model 75. We feel it has enough "built in reserves" to take care of any contingency or new development which may come up. It's reassuring to know that an investment of this size won't go out of style next month."

Why don't you get the full story on the many features and advantages offered you with a Bullard H.B.M., Model 75 in your plant. For a complete line catalog, just call your nearest Bullard Sales Office, Distributor or write

THE BULLARD COMPANY BRIDGEPORT 9, CONN.

NOTHING *can equal* *Stainless Steel*

for its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

For Consumer Appeal. General Ionics Corp. is the first company to offer an all Stainless Steel water conditioner. Sales have boomed because of its handsome appearance and complete freedom from corrosion problems. The company even offers a 10-year warranty to prove their faith in USS Stainless Steel.

For Long Life. All over the country, dairies are switching to Stainless Steel milk cans because they never have to be plated, the smooth surface does not harbor milk solids and bacteria, and, for all practical purposes, the Stainless milk can simply will not wear out.

For Corrosion Resistance. Laboratory fume hoods at the New Jersey Zinc Company used to last no more than 18 months—and sometimes they looked like sieves after only three months. They replaced the hoods and piping with Stainless Steel, and after five years they still look like new.

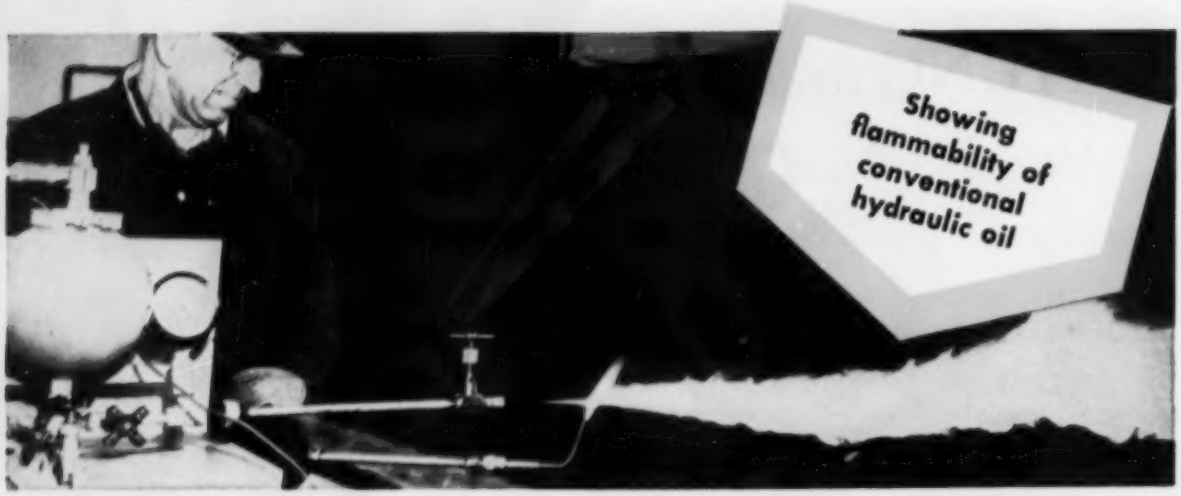
UNITED STATES STEEL CORPORATION, PITTSBURGH
AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

UNITED STATES STEEL



Flame tests prove its fire-snuffing ability

SHELL
IRUS
FLUID 902

Entirely new formula: Shell Irus Fluid 902 is a special formulation . . . product of three years' development and field testing. It is suitable for nearly all industrial hydraulic systems, as a direct replacement for presently used oils. *Here is a fire-resistant hydraulic fluid that can be widely used.*

Non-corrosive: Shell Irus Fluid 902 contains no corrosive ingredients. It has no harmful effects on seals, fittings or bearings. It does not promote rust.

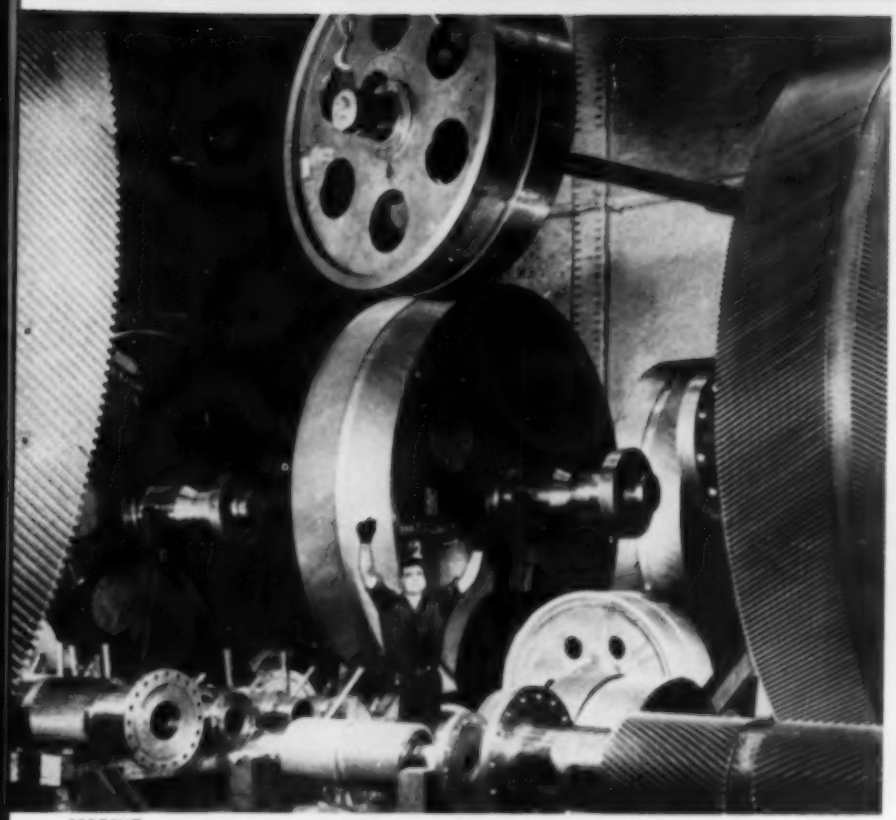
No major modification necessary . . . simply clean present fluid thoroughly out of system and replace directly with Shell Irus Fluid 902. You can use it with complete confidence. Write for test data and all information.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

BARIUM STEEL—active in America's growth

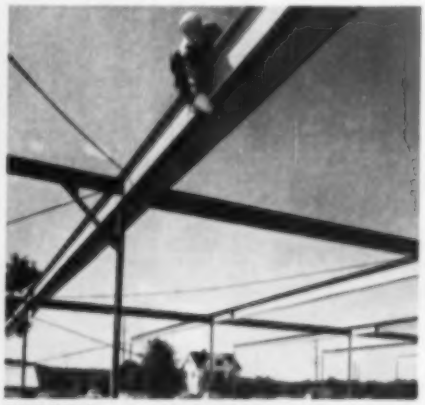


MARINE propulsion gears, an integral part of General Electric ship propulsion units, use steel plate from Barium's Phoenix Iron & Steel Company, Plate Division. These massive web plates are welded to forged steel rims and hubs—the most practical method of construction for large diameter marine gears (up to 16⅔ feet). In addition to steel plate Phoenix also produces structural steel shapes, heavy wall seamless pipe, and turns out large and small steel fabrications.

MATERIALS-HANDLING at this East Coast shipyard centers around the Clyde crane above with its 20-ton capacity, 65-foot reach and mobile 70-foot tower. It's only one of many cranes that Barium's Clyde Iron Works has supplied to this customer. If you've got a materials-handling problem coming up, chances are a Clyde crane, hoist or unloader can give you the lift you're looking for.

HIGHWAY builders timed the installation of this 132-ton, 180-foot-long girder fabricated and erected by Barium's Phoenix Bridge Company at an incredible 27 minutes. This Phoenix-built bridge will carry the New England Thruway over the 4-track main line of the New York, New Haven and Hartford at New Rochelle, New York. Part of the credit for quick work against a tight railroad schedule goes to the Barium-built 100-ton Clyde derrick.

Project of New York State Dept. of Public Works. General Contractors: Arthur A. Johnson Corp., MacLean Grove & Company, Inc.



BUILDING going up here (New Providence, New Jersey) is a new plant for EXCO, Inc. Structural steel comes from Barium's Phoenix Iron & Steel, Structural Division. Elizabeth Iron Company of Elizabeth, N. J. are steel contractors on this job; they find Barium a good company to work with on small as well as large jobs.

CONSTRUCTION of New York's 30th Street Heliport began as this Wiley floating crane with its 110-foot boom slammed the first steel pile down to bedrock. Barium's Wiley Manufacturing Company, the nation's largest manufacturer of floating cranes, built this one for George W. Rogers Construction Corp., contractors for the Port of New York Authority. Wiley also produces work boats and steel barges.

BARIUM
STEEL CORPORATION
A GROUP OF INTEGRATED COMPANIES

Steel producers, fabricators, product manufacturers

For further information on this close knit, alertly managed team of companies—its engineering resources, production facilities or specific products—write for "The Barium Story" to:

25 BROAD STREET, NEW YORK 4, N. Y.

64

this 140-TON horizontal milling machine

also bores and turns

There's never been one like it before!

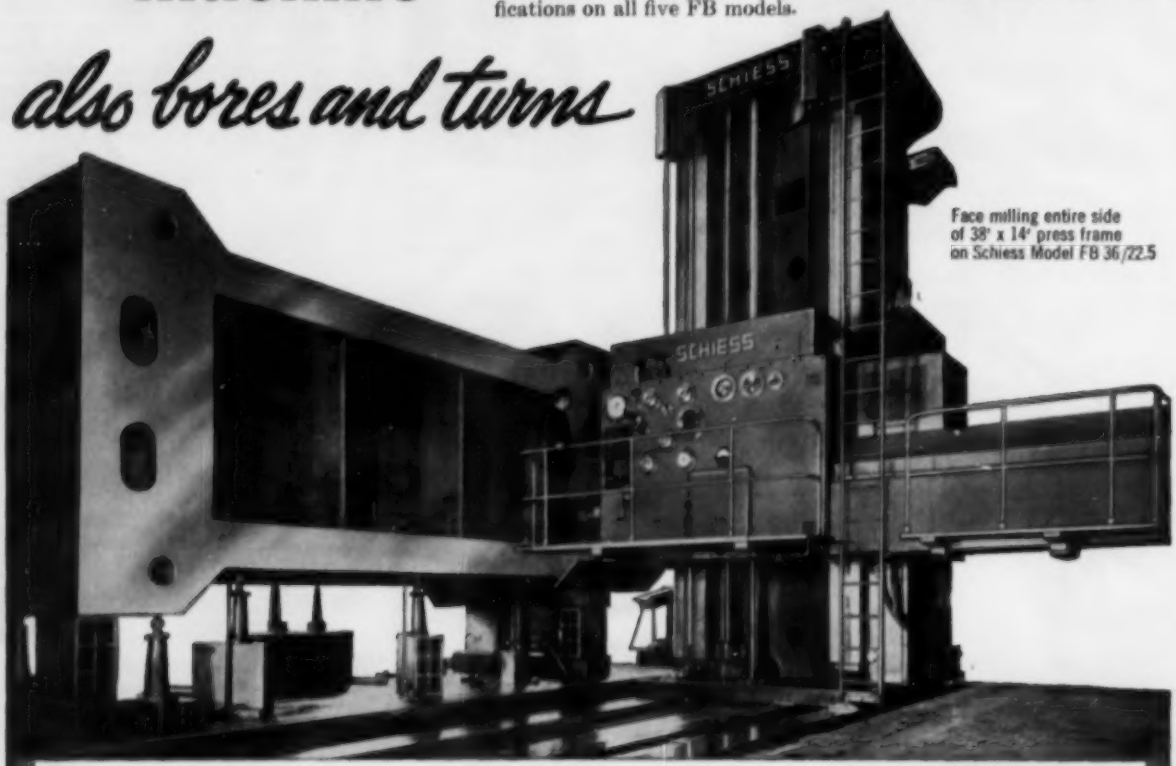
Just a press of a button puts this mighty Schiess into action. A 25-ft. high column moves smoothly along 45-ft. long bedways. Never a vibration—no chatter—even at maximum transversal loads! The new Schiess design of the spindle heads has eliminated this!

THE MILLING OPERATION. A huge tungsten-carbide cutter in a 14¼" spindle goes to work on the stock. And performs its operation with a consistent accuracy—a surface-finish count—never before obtainable on such a big fellow.

THE BORING OPERATION. Another press of a button! Another spindle goes to work—bores a 79" depth in one cut—or a total depth of 118". Boring and milling spindles are provided with 36 speeds of which the top 12 are V-belt transmitted. Rapid traverse, feeds and manual controls of the two spindles are completely independent.

That this mighty machine has tremendous productive capacity is self-evident. And its productivity goes far beyond conventional milling and boring. Schiess attachments increase its scope to taper-milling, thread-cutting, copying and, in certain instances, copying in 3 dimensions. It's a time saver, too. Can go from feed to rapid traverse immediately, without complicated adjustments.

The Schiess Model FB 36/22.5 Horizontal Milling and Boring Machine is a product of Europe's largest builder of heavy machine tools. Parts and service are as close as Pittsburgh. An American Schiess Engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on all five FB models.



Face milling entire side of 38' x 14' press frame on Schiess Model FB 36/22.5

engineering division

SCHIESS

AMERICAN SCHIESS CORPORATION

1232 Penn Avenue, Pittsburgh 22, Pa.

It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

Empire State Building, world's tallest building.

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Subsidiary of The Colorado Fuel and Iron Corporation

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NOW

EFFICIENT FIRE PROTECTION FOR HYDRAULIC SYSTEMS WITH THESE TWO HOUGHTON FLUIDS:

HOUGHTO-SAFE 620

For all normal hydraulic temperatures and bearing loads (up to 85% of all needs)

HOUGHTO-SAFE 620 is a time-proven water-base hydraulic fluid that provides maximum protection against hydraulic fires. Its efficiency is proven by more than 4 years use in industry and over 2 years in Navy carrier catapults.

HOUGHTO-SAFE 620 has no effect on standard packings used in oil or water hydraulic systems—is not toxic—and provides greater efficiency at lowest installed cost for most hydraulic systems.

THE NEW

HOUGHTO-SAFE 1020

For systems running consistently over 150°F. and for heavily loaded pumps and bearings

HOUGHTO-SAFE 1020 is a new *fortified* synthetic hydraulic fluid expressly compounded to provide greater efficiency in systems where temperatures repeatedly exceed 150°F.

HOUGHTO-SAFE 1020 provides complete rust protection; resists foaming; is stable in use and storage, low in toxicity, and high in oiliness. It's *different* from former non-aqueous fluids.

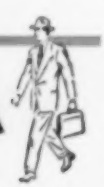
Find out today how you can now eliminate the fire hazard in any hydraulic system with the Houghton fire-resistant fluid that will provide greatest operating efficiency. Ask your Houghton Man or write to E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

HOUGHTO-SAFE

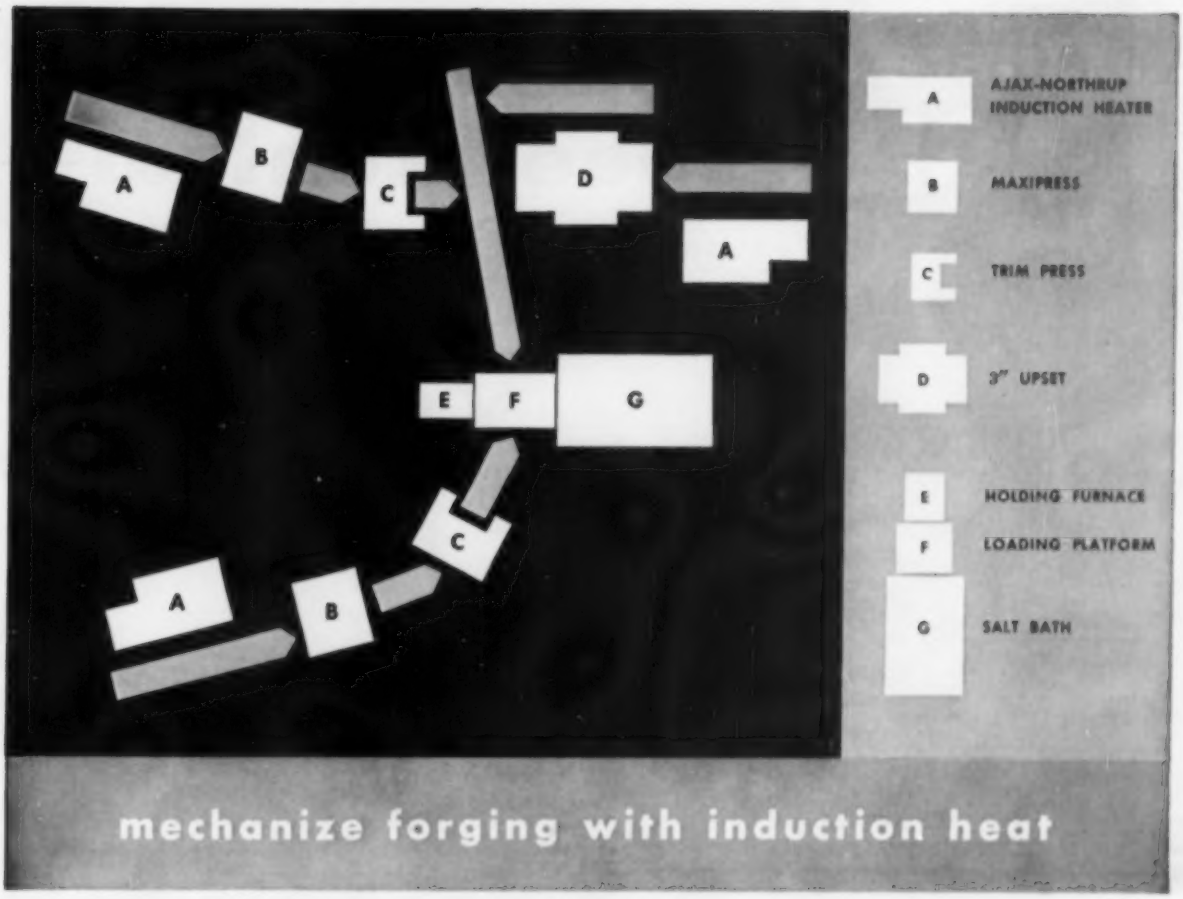
. . . products of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO



Ready to give you on-the-job service . . .



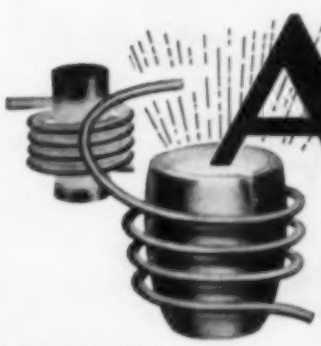
Versatility made Ajax induction heating a natural choice for Massey-Harris' mechanized forge. This one shop handles all the common forging steels, in blanks ranging from one inch rounds to four inch squares, used to make a hundred different automotive and tractor parts. Imaginative forge design, plus the inherent flexibility of Ajax induction heating, make it possible to operate the entire forge with just three induction units . . . each equipped with seven heating fixtures.

The seven fixtures to be used for any given piece can be withdrawn quickly and easily from a "library" adjacent to the forge. Here more than one hundred Ajax-Northrup heating fixtures are completely catalogued and filed in terms of the piece for which they were designed. And the relatively low cost of the fixtures permits Massey-Harris to keep sixty "spares" on hand.

The unusual versatility of this induction heater library is the key to forge mechanization. But Ajax induction heating goes on to pay its way through numerous other advantages. Compared with fuel-fired equipment, for example, induction heating requires less steel, less heating time. There's less scale, dies last longer, rejects are fewer, and working conditions are far better.

Is it any wonder that more forges every day—mechanized or not—are turning to Ajax induction heat? Write Ajax Electrothermic Corporation, Trenton 5, New Jersey, requesting Bulletin 27-B.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.

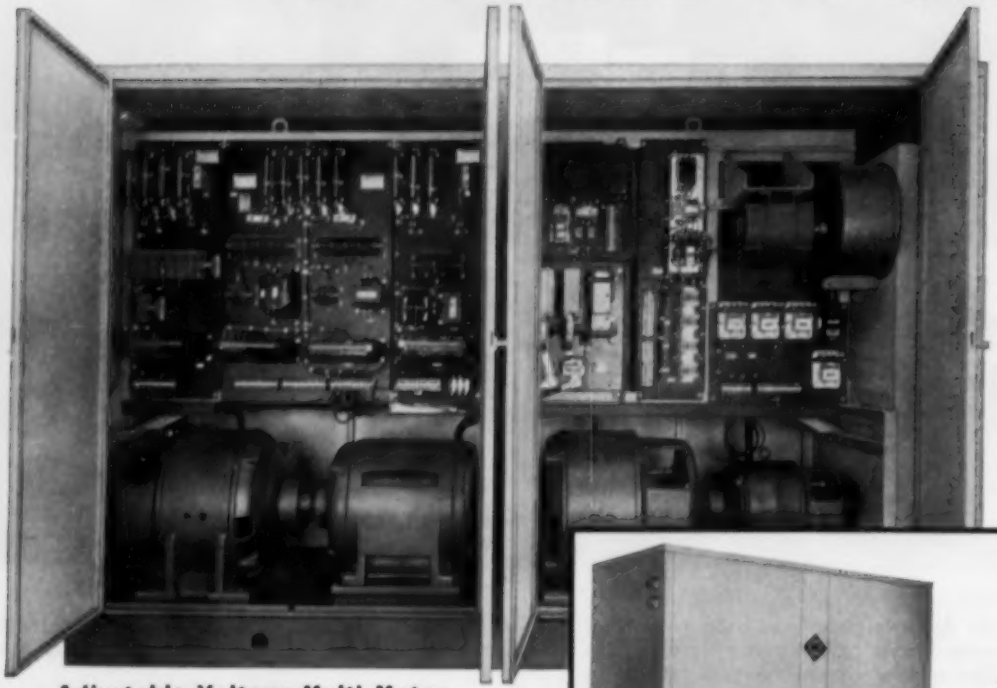


AJAX NORTHRUP SINCE 1916

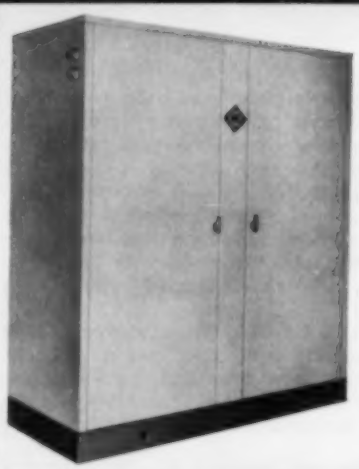
INDUCTION HEATING-MELTING

There's MORE dependable speed control

- high response
- high shock resistance
- no fragile parts
- no maintenance



Adjustable Voltage Multi-Motor Package Drive used with heat flattening and coating equipment. Unit features magnetic amplifier control of tension and strip speed.



Size 3 Adjustable Voltage Power Unit rated 30 hp, of standard construction. Magnetic amplifier excitation provided.

Every one of the design features of the Allis-Chalmers Adjustable Voltage Package Drive assures you an easy, dependable means of power conversion.

Key to Package Drive dependability is the use of a magnetic amplifier to excite the field of the power unit m-g set. Sturdy and simple, this amplifier has no moving parts to wear out . . . no fragile components to be affected by vibrations. AND — there's no wasteful "warm-up" time needed. At the turn of a dial, you get immediate speed control.

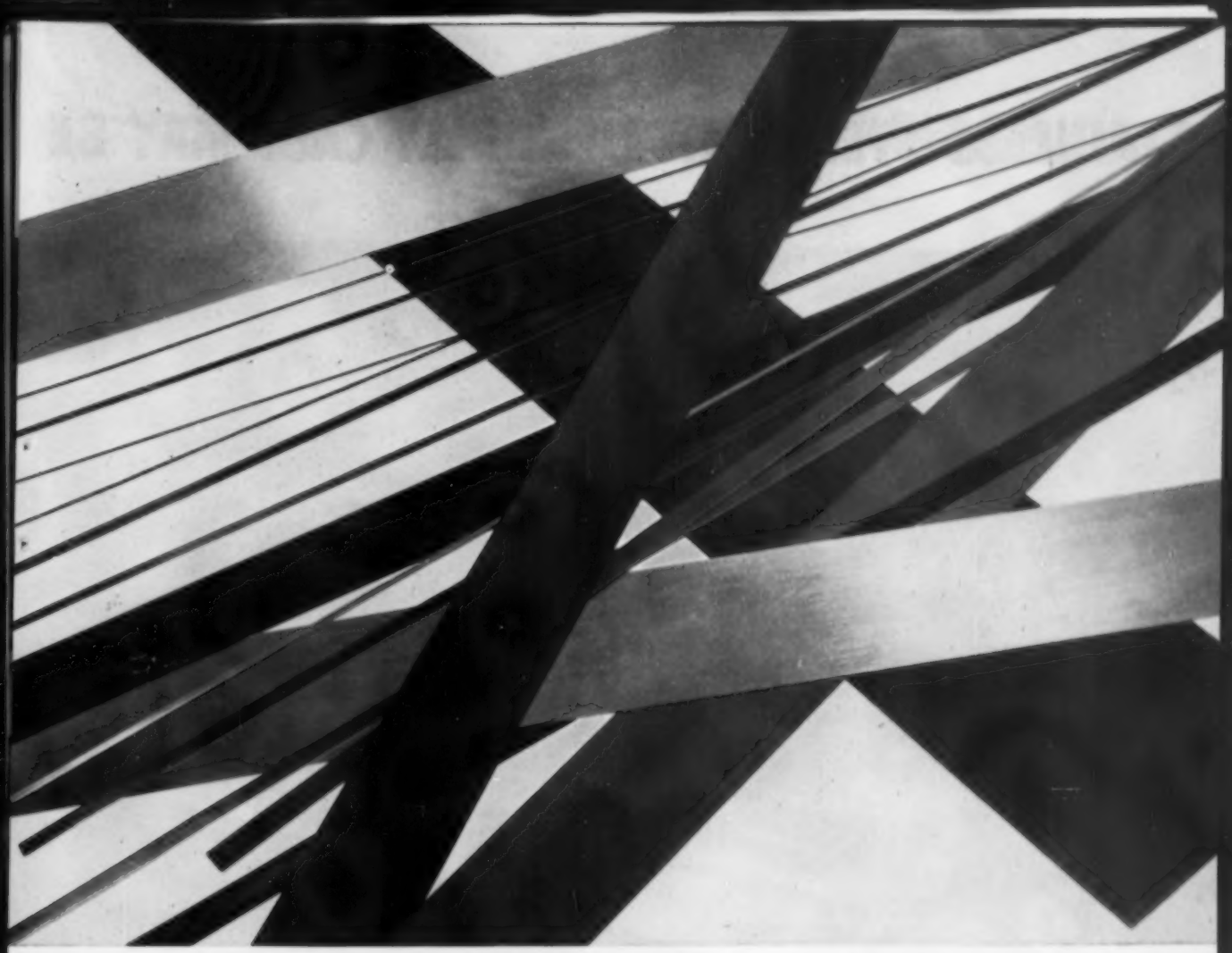
Cost-saving assembly

M-g set and control components are assembled in the power unit enclosure at the factory — saving you installation costs. Enclosures used for 30 through 200-hp units are completely collapsible and may be easily disassembled without loss of rigidity. Larger units have separately driven blowers to provide positive ventilation and pressure even when unit is idle.

Available in units from 5 to 200 hp, the package drive is ideal for any application requiring adjustable speed. Contact your nearby Allis-Chalmers sales office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5166



How these "educated" steels make products behave better

● Nobody will deny that there can be a vast difference between steels that are supposedly alike. The difference lies in "tremendous trifles" that often make all the difference between smooth and erratic fabrication or between satisfactory and faulty product behavior.

That's why the steels shown above are "educated", you might say—educated for special use. Because here at the *Athenia Steel Division* of National-Standard we've concentrated for years on learning about and *controlling* those tremendous trifles! In turn, this learning and experience is put right into the Athenia steels that successfully meet many of the toughest assignments known today.

If your production calls for cold rolled flat steels of .45 carbon or higher, from .015" to 16" wide and from .001" to .065" thick, it would be a good idea to explore Athenia quality, performance and service.

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

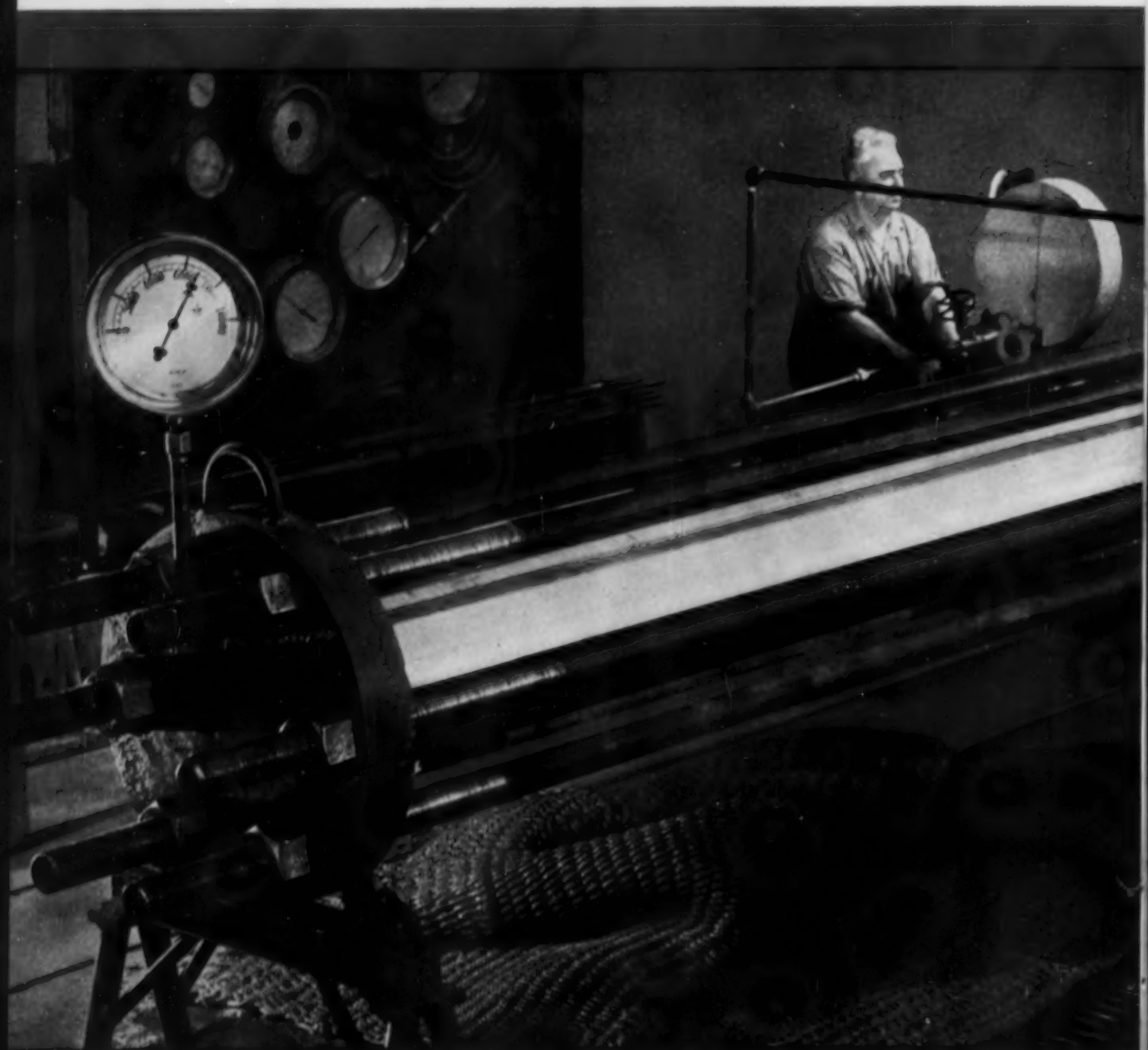
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS NATIONAL-STANDARD Company NILES, MICHIGAN

WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

STAINLESS STEEL CENTRIFUGALLY CAST MAY BE



ABOVE: Hydrostatic test rig used to qualify each length of pipe.

UNITED STATES PIPE & FOUNDRY CO.

Steel and Tubes Division

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, SAN FRANCISCO, CHICAGO, ST. LOUIS, COLUMBUS, DETROIT, PITTSBURGH, HARTFORD, BURLINGTON

THE ANSWER TO YOUR PIPING PROBLEM

Patented U.S.P. process meets rigid refinery specifications

The men who design today's petrochemical plants, refineries or Atomic power plants are confronted with piping problems involving temperatures, pressures and corrosive conditions which only a few years ago would have been called impractical, if not impossible.

U. S. Pipe's Steel & Tubes Division recently completed a piping requirement for 700 feet of Type 316 Extra Low Carbon, columbium-bearing stainless for a large petrochemical plant, which is typical of the job metal mold centrifugally cast pipe is doing today under a patented manufacturing process with rigid Quality Control.

U. S. Pipe is headquarters for metal mold centrifugally cast alloy and stainless steel pressure pipe over a wide range of special and standard analyses —in large or small quantities.

Write and outline your refining problems. We may be able to help.

Note these exacting specifications on 316 Cb ELC Stainless Steel Pipe demanded by one of nation's leading oil companies:

MATERIAL REQUIREMENTS: Pipe shall conform to ASTM Specification A-362-52T.

CHEMICAL ANALYSIS: Modified AISI Type 316 Cb (ELC), with *one percent* spread on chrome and nickel.

FINISH: Each pipe to be turned, bored and faced to surface finish of 125 micro inch or better. O.D. tolerance plus 1/16" minus 0"; I.D. tolerance plus 0" minus 1/32".

MECHANICAL TESTS: Tensile Tests—2 tests required on each pipe after heat treatment; one at room temperature, one at 700° F.

INSPECTION REQUIREMENTS

1. Etching test on sections cut from each end of pipe.
2. Radiographic Inspection—Required complete circumferential coverage of at least an 8" wide section at each end of each pipe in accordance with ASTM Specification E71-52.
3. Fluid Penetrant—Entire O.D. and I.D. surface each piece.

HEAT TREATMENT: Heat for 4 hours at 2100° F.—2150° F., water quench, follow by 5 hours at 1500° F.—1600° F. Cool in still air.

HYDROSTATIC TEST: Each length tested to stress of either 90% of the minimum cold yield strength or a maximum pressure of 6800 psi—whichever is lower.

SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter—6" to 50"
Wall Thickness—⅜" and up
Length—Up to 16'
Types of Stainless—All Standard AISI and ACI grades of ferritic and austenitic stainless, including No. 20 Alloy, 17-4 P H, 17-7 P H and E.L.C. grades.

HOW TO PUT HALLOWELL SHOP DESKS TO WORK IN YOUR PLANT

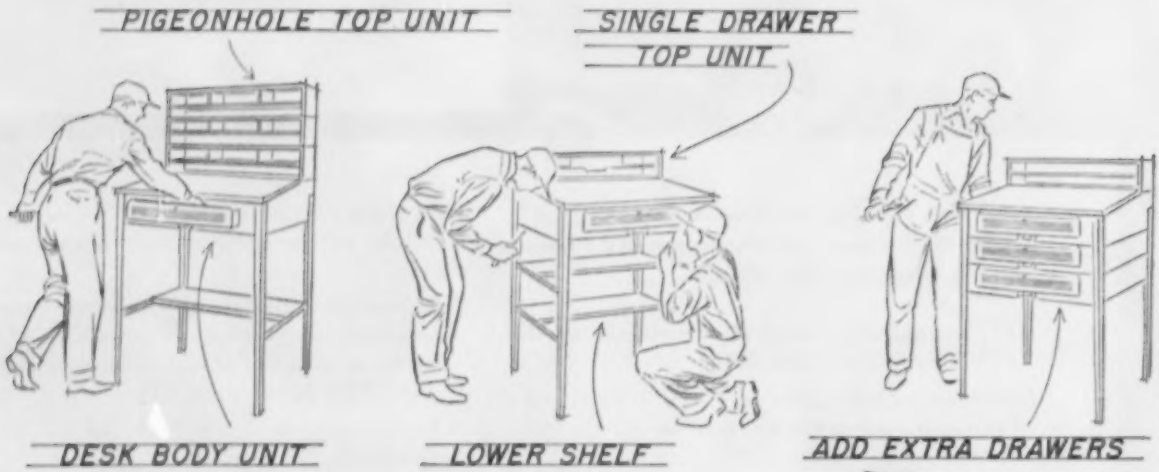
BUY THESE STANDARD MODELS

MODEL 406

MODEL 409

MODEL 400

OR USE INTERCHANGEABLE PARTS TO CUSTOM BUILD THESE DESKS



Sturdy steel for years of use · Large, smooth writing surface · Drawers that glide on roller bearings, have recessed drawer pulls · Built-in lock · Green baked-on enamel finish · Stocked by leading shop equipment dealers · Ask for Bulletin Hallowell Shop Equipment Division, Standard Pressed Steel Co., Jenkintown 33, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION
STANDARD PRESSED STEEL CO.
SPS
JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

Why CIMCOOL leads the parade . . .

There are three booming reasons why CIMCOOL° is way out in front—actually the largest selling chemical cutting fluid in the world. And each deserves a rousing cheer as they pass in review:

CIMCOOL LOWERS COSTS because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.

CIMCOOL DOES A BETTER JOB because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.

CIMCOOL IS CLEAN, doesn't soil hands or clothing. It contains no skin irritants. It leaves no slippery film on shoes, floors, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

So join the parade—switch to CIMCOOL, then listen to the sweet music of your machines as they hum with increased production . . . and to the jingle of money saved.

For complete details on all the advantages of CIMCOOL Concentrate, consult your CIMCOOL distributor. He'll be happy to tell you all about CIMCOOL—as well as the entire family of CIMCOOL Cutting Fluids. Or contact us direct and we'll send one of our Cincinnati Milling-trained machinists to call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

CIMCOOL CUTTING FLUIDS

CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT **Base Additive**—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds and feeds.

CIMCOOL **Bactericide** — The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL **Machine Cleaner** — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

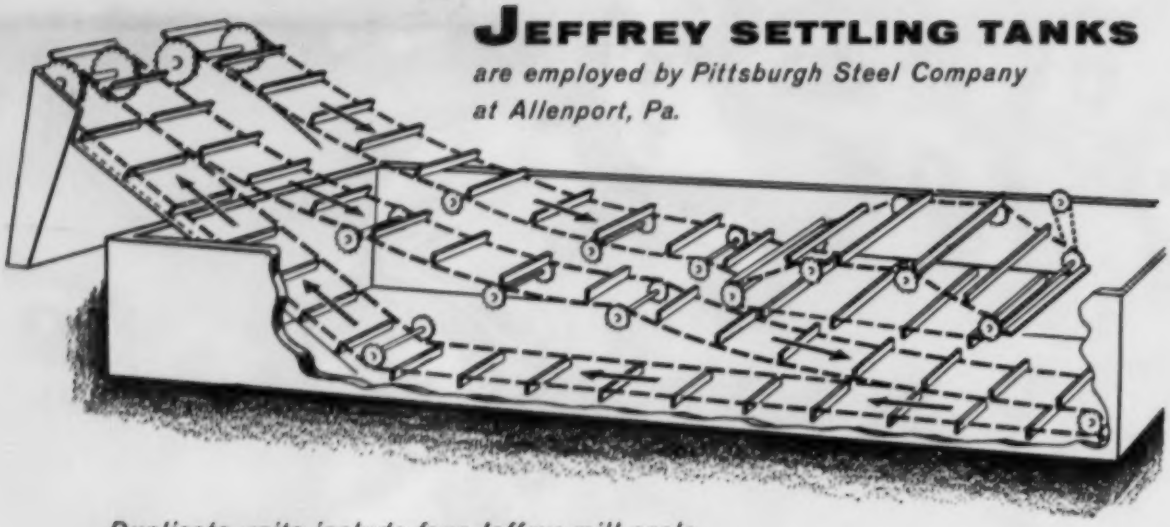
CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

JEFFREY SETTLING TANKS

are employed by Pittsburgh Steel Company at Allenport, Pa.

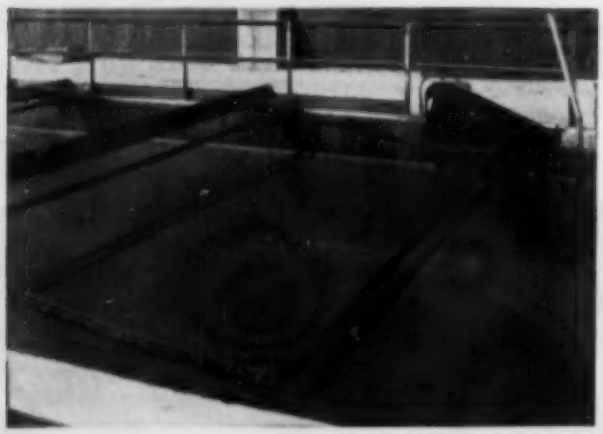


Duplicate units include four Jeffrey mill scale collectors and two Jeffrey scum skimmers

Water borrowed from the river is cleaned before its return

Above: Jeffrey mill scale collectors

Below: Jeffrey scum skimmers



WATER DISCHARGED to the Monongahela River, after passing through this Jeffrey clarification system, fully meets the State of Pennsylvania's anti-pollution requirements.

Solids and grease content are low after treatment . . . as little as 2.5 parts per million of grease remain after passing through the scum skimmers.

At this plant, water is plentiful, so Jeffrey's assignment was to prevent stream pollution. In other industrial areas water may be scarce, so Jeffrey equipment cleans it for repeated use. Valuable mill scale is recovered, too.

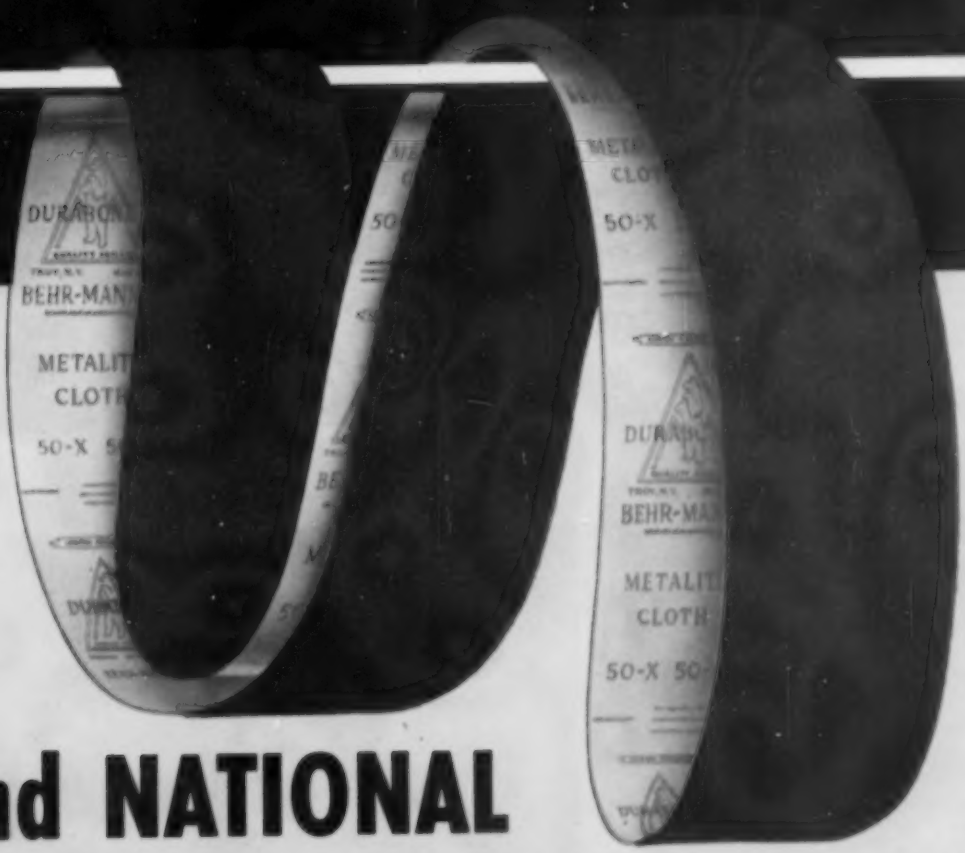
Whatever your water treatment problem—stream pollution, recovery of valuable solids, water conservation—turn it over to Jeffrey sanitation engineers. They'll help you plan a system to meet your requirements. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

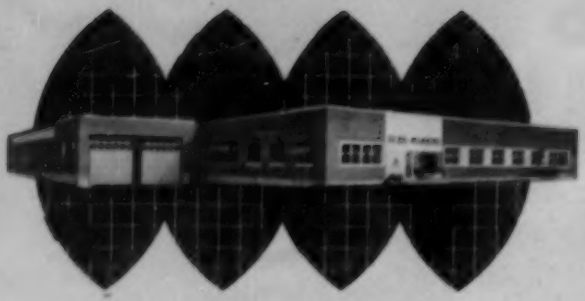
CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

BEHR-MANNING

ANNOUNCES...



2nd NATIONAL METAL FINISHING SHOW



At the Behr-
CLEVELAND, OHIO

See the latest coated abrasive machines and methods

Here is the production opportunity of a lifetime. In one place and one time, **all** the leading machinery manufacturers will be demonstrating and explaining their newest grinding and polishing equipment. Every — **every** — type of coated abrasive metalfinishing machine will be there **for your use.** This show is new, it's big, it's timely — **it's different!**

Different? Indeed it is! You actually **bring your parts** and test them on any or all of these newest of coated abrasive machines. Right on the show floor. There's no obligation. What's more, the machine and coated abrasive engineers — the metalfinishing experts — will be right at your side to talk it over, make suggestions, and help you solve your problems.

This is the show you can't afford to pass up! Plan now to attend. The time — October 30 through November 2, 1956; the place — 4101 West 150th Street, Cleveland; the opportunity — to learn how **you can achieve** improved finish, increased production, and greater economies on **your particular operation.**

Join in this interesting 3-part abrasive course given at the show

How to choose industrial coated abrasives

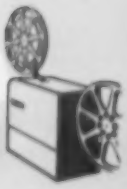
You'll learn the advantages of different coated abrasives, and how grain, bond, and backing affect a product's performance at a special course just off the show floor.

Manning Methods Room

▲ OCT. 30 to NOV. 2, 1956

Attend the Premiere of our new coated abrasive film

COATED ABRASIVES TODAY...A TOOL FOR BETTER PRODUCTION



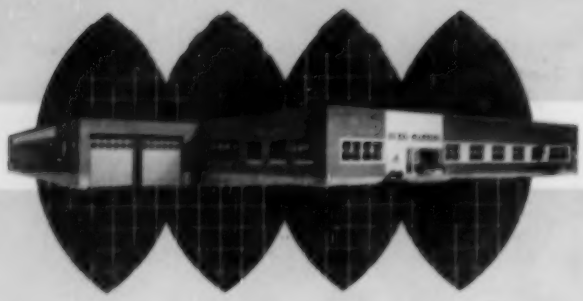
See the premiere of Behr-Manning's new metalfinishing motion picture. See innumerable cost and time saving coated abrasive applications. Filmed across the country in color and sound.

Theory and application of abrasive machinery

The principles of the various coated abrasive machine tools will be explained, too. That's part two of the course. Experienced engineers will be your instructors.

Demonstration of abrasive products

Finally, there will be grinding and polishing demonstrations. You'll want to take part in this informative 3-part course. Mark the dates on your calendar now.



WHETHER IN CLEVELAND

...OR ANYWHERE ELSE IN THE WORLD

...FOR THE NEWEST IN COATED ABRASIVES

WATCH BEHR-MANNING

BEHR-MANNING CO.
A DIVISION OF NORTON ABRASIVES

Put this card on CALL OUT as a Reminder —

2nd NATIONAL METAL FINISHING SHOW

Where . . . Behr-Manning, 4101 West 150th Street, Cleveland 11, Ohio

When . . . OCTOBER 30 - NOVEMBER 2, 1956

BRING PARTS AND PROBLEMS

How Rollpin cuts assembly costs

by matching the insertion method to the assembly problem

HAMMER IT IN . . .

. . . USE HAND TOOLS

. . . POWER TOOLS

. . . OR AUTOMATIC EQUIPMENT

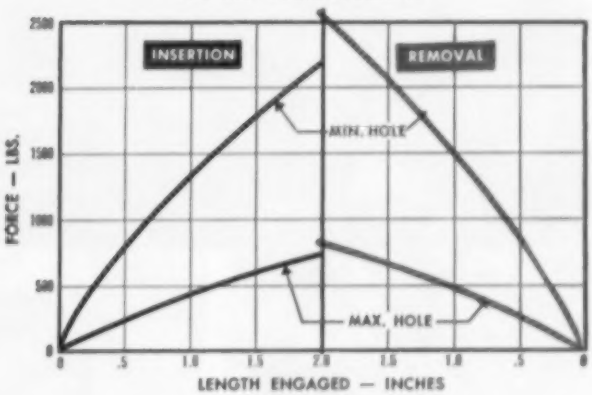
ESNA

ROLLPIN TRADEMARK

It's as easy to insert a Rollpin® as it looks. And it's fast any way you do it. You can use a hammer, hand tool, power tool or automatic equipment. Insertion cost is less because no precision drilling or reaming or secondary locking operations are required. A hole drilled to normal production standards will do.

Rollpin is a slotted, chamfered, cylindrical spring pin. It locks securely in place—and can be drifted out and reused over and over again. Rollpin replaces taper pins, straight pins and set screws; for many applications it will serve as a rivet, dowel, hinge pin, cotter pin or stop pin.

TYPICAL INSERTION AND REMOVAL FORCES IN STEEL FOR .250" DIAMETER ROLLPIN



WHY ROLLPIN IS SELF-LOCKING. Here is graphic evidence of the forces that make Rollpin a truly self-locking spring type fastener that will remain tight under vibration until deliberately removed.

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. R45-1060, 2330 Vauxhall Road, Union, New Jersey

Please send me the following:

☐ Rollpin installation data

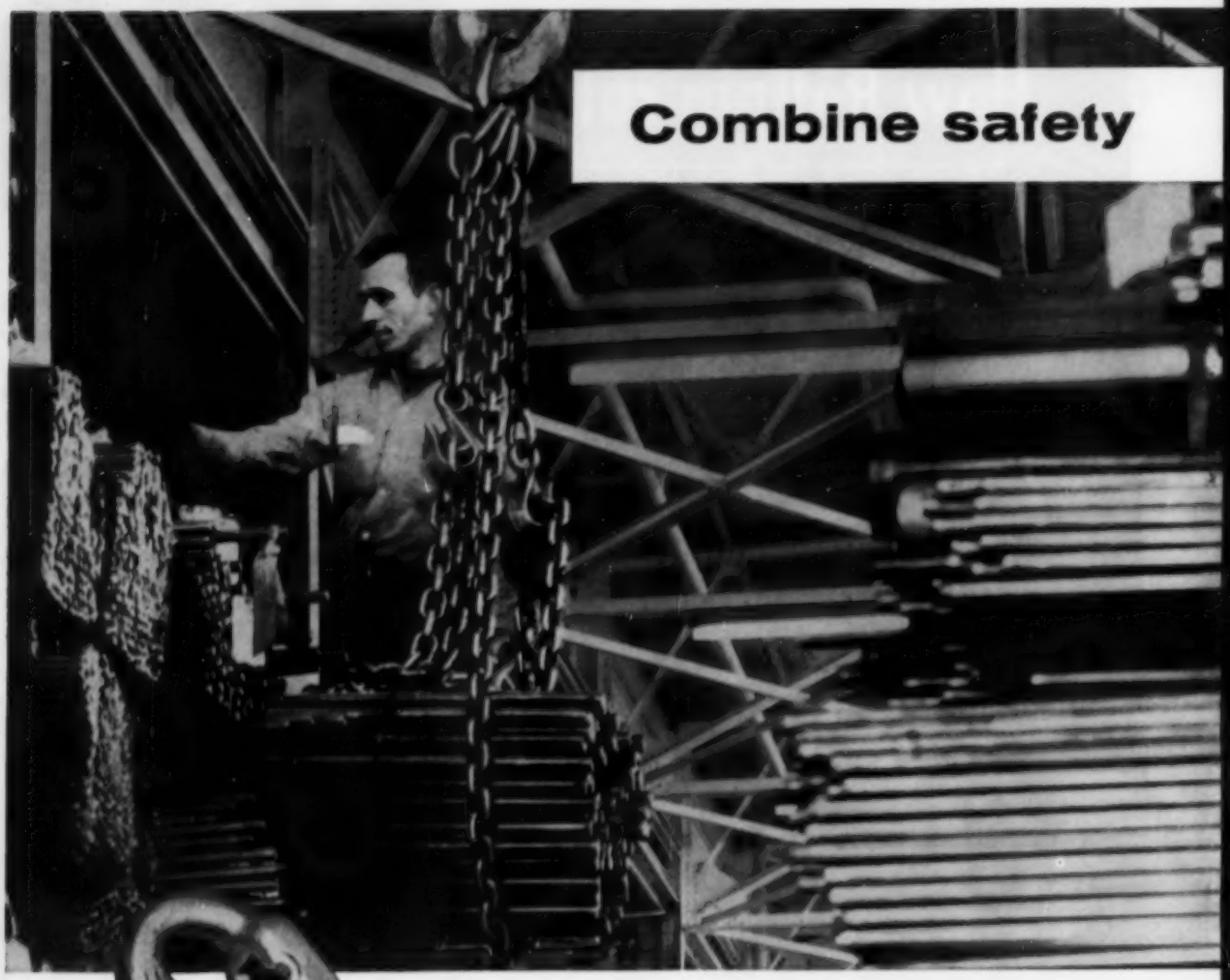
☐ Here is a drawing of our fastening problem. What insertion method would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____



Combine safety

INITIAL ASSEMBLY or REPAIR of chain slings such as that shown above is easily accomplished with Wedglok Safety Connecting Links. Inset, left, shows simplicity of Wedglok. Slip half of each link into sections being connected. Then assemble halves and drive the spacer. Peen over projecting points on spacer. Resulting link is as strong as original equipment. Disassembly is easy, too. Just burn out the spacer. Reassemble, using replacement spacer.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

and efficiency with REPUBLIC ALLOY STEEL CHAIN and WEDGLOK* CONNECTING LINKS

Increase service life; lower replacement costs; make safe, permanent or temporary chain product assemblies. These are a few of the many ways you can make more efficient use of Republic Alloy Steel Chain in combination with Wedglok Safety Connecting Links.

Wedglok Links are available in various sizes of five different designs. Each is as strong as comparable-size alloy chain. Each can be quickly and easily field-assembled without special equipment.

Result: you can replace a damaged link and put your chain assembly back into full service without costly delay, or unnecessary replacement of the entire unit. Or you can make new assemblies using running lengths of Republic Alloy Steel Chain with necessary accessories, without waiting for factory shipments. Use of Wedglok Links eliminates dangerous makeshift methods and questionable field welds.

Your Republic Chain Distributor has ample supplies of safe, strong Wedgloks, chain attachments, and accessories. His complete stock includes Republic Alloy Steel Chain in all types and sizes. Made from special analysis open hearth steel, quality controlled from ore to finished product, Republic Alloy Chain is safe, strong, lightweight and easy to handle. Precise heat treatment develops the highest possible tensile strength and maximum resistance to wear, shock, strain and work hardening. Stress relief or re-heat treatment is unnecessary.

Whatever your chain application, it will pay to consult your Republic Chain Distributor. His vast experience and complete stock of all chain products assure you the best combination to provide maximum safety and efficiency. Mail the coupon for further information.

EFFICIENT OPERATION of this compressor depends on maintaining a hermetic seal. Critical point is assembly of cylinder head, valve plate, gaskets and block. Republic Alloy Steel Hex Head Cap Screws clamp these components into a solid, leak-proof unit. Their high tensile strength, yield point, hardness and ductility assure a permanent seal through years of cyclic operation.

COMBINED STRENGTH and internal quality of these magazine press side frames is made possible with Chateaugay, Republic's exclusive premium Pig Iron. In addition, Chateaugay's fine grain structure provides outstanding machinability. Apply these benefits to your castings. Mail coupon to secure services of a Republic Pig Iron Metallurgist.

EFFICIENT HANDLING reduced costs 25% in this application, using Republic PB-120T Box and Skid Units. They freed valuable floor space, provided better product visibility and minimized inventory time. Republic Materials Handling Equipment includes a variety of standard boxes, pallets and skids. Or specialized designs can be furnished to meet unusual requirements.

*Patented and patents pending

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-2556
3120 East 45th Street, Cleveland 27, Ohio

Please send me further information on:

- ☐ Alloy Steel Chain
- ☐ Wedglok Connecting Links
- ☐ Alloy Steel Cap Screws
- ☐ Materials Handling Equipment
- ☐ Please have a Pig Iron Metallurgist call.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

Concentration on Progress

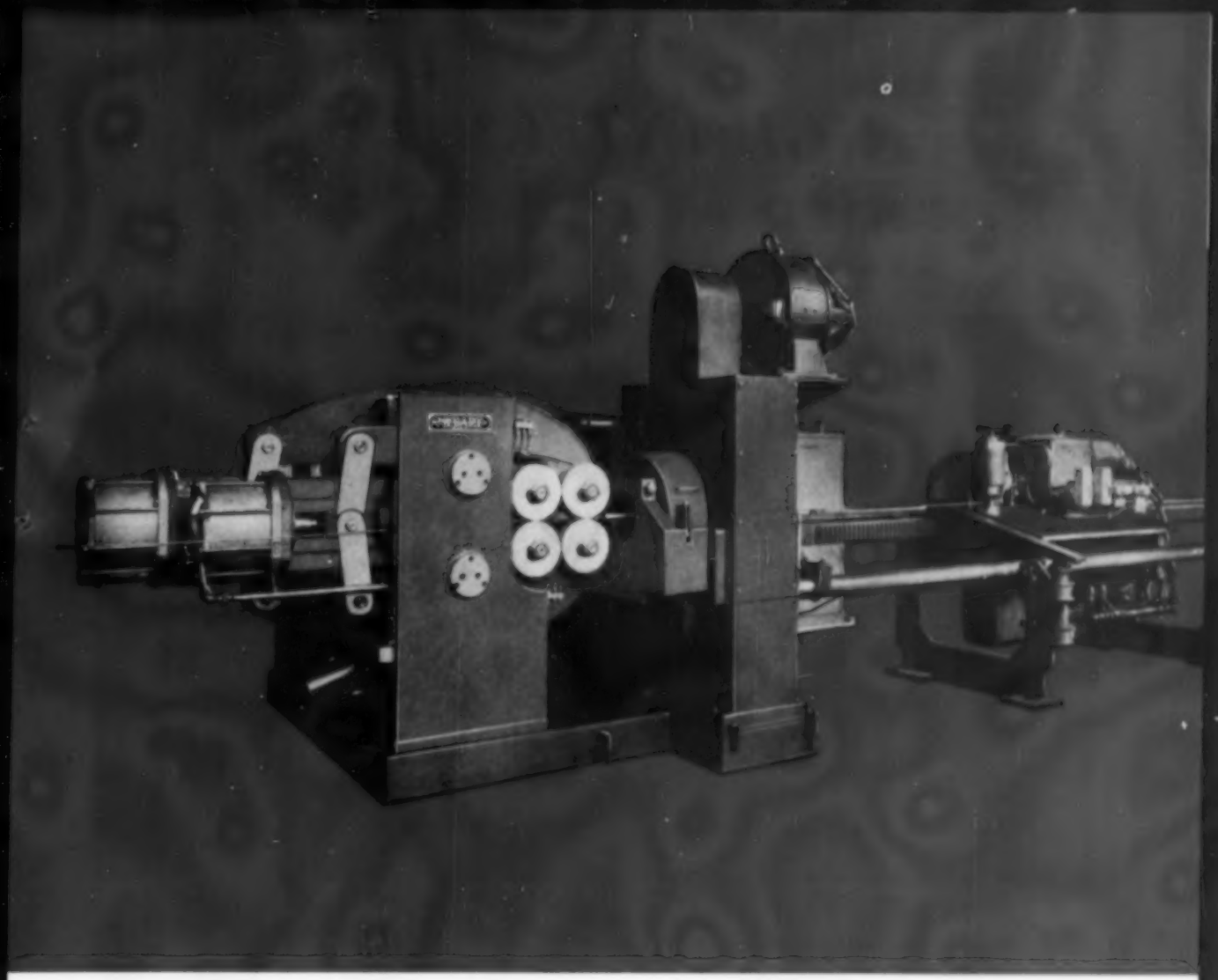
in the Production of High Grade Iron Ore

At CLIFFS the engineer, the geologist, the metallurgist, the miner and the sales executive are working as a team to aid the steel making industry of this country.

IRON ORE ★ ALLOYS ★ VESSEL TRANSPORTATION ★ COAL

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO



BLAW-KNOX MEDART *makes what it takes*
for high speed, carbide, centerless bar turning

The new Blaw-Knox Medart RFPD Centerless Bar Turner is designed especially to take advantage of higher cutting speeds possible with carbide cutting tools. One pass through the machine accomplishes a complete removal of surface defects and decarburization at high production rates. And you get 100% recovery in the form of chips.

A patented "torque chipping" device absorbs the twisting imposed on the workpiece by the cutting tools. This feature opens an entirely new field of turning small diameter bars. The workpiece is centered in the cutterhead regardless of variation in diameter by a pneumatically operated device on the roll feed. The workpiece is kept under positive tension by the pull-out carriage throughout the cutting action.

Blaw-Knox Medart fully automatic Centerless Bar Turners are available in sizes for turning ½" to 9" diameter bars. Call us for complete details, technical assistance or service.

50th Anniversary
BLAW-KNOX
1906-1956

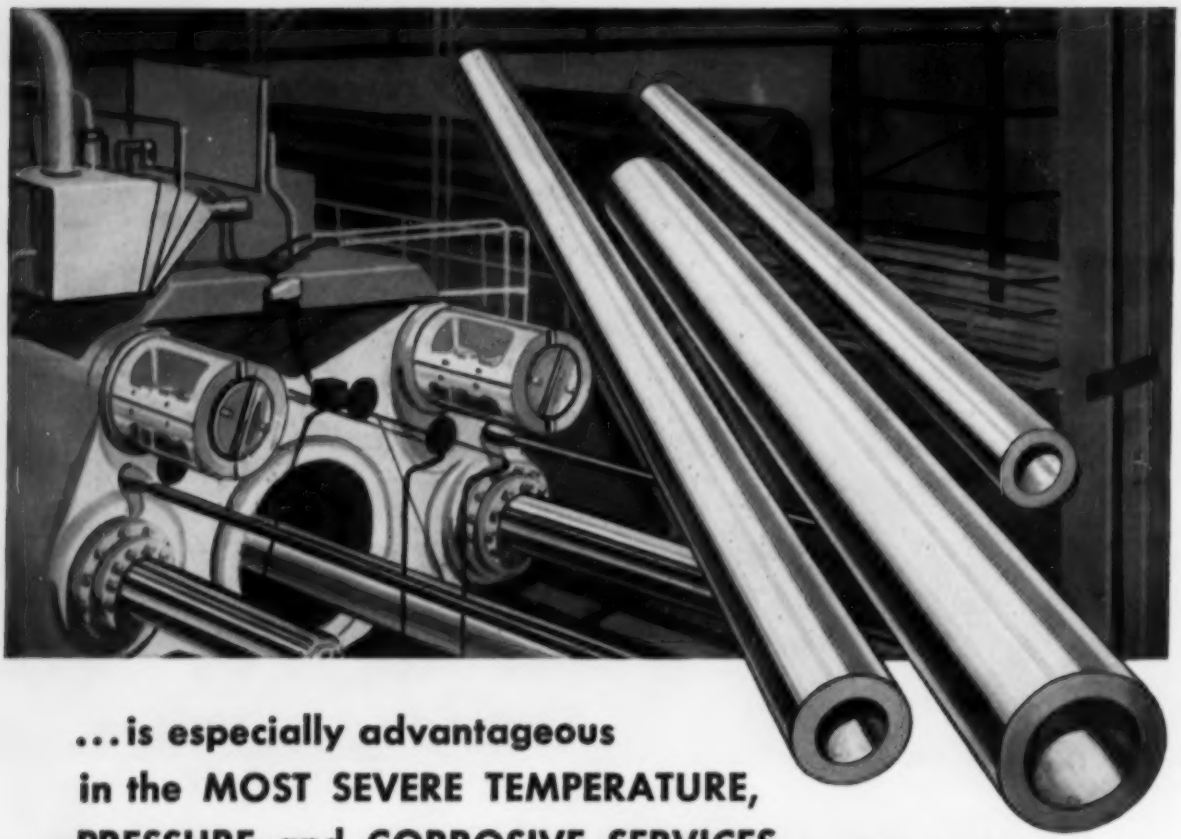
BLAW-KNOX COMPANY
Foundry & Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

CONTINENTAL

HIGH INTEGRITY

EXTRUDED ALLOY STEEL PIPE

available from 4" to 22"O.D. in practically any wall thickness



...is especially advantageous in the MOST SEVERE TEMPERATURE, PRESSURE and CORROSIVE SERVICES

A specially-built 12,000 ton extrusion press – capable of processing any of the stainless or other ferrous alloys – imparts vastly improved mechanical properties to new Curtiss-Wright ***HIGH INTEGRITY*** pipe. *High ductility with high strength* and *higher resistance to stress at high temperature* are automatically built into even the largest diameters and thickest-wall products. In the larger diameters, 10" and above, the economics of ***HIGH INTEGRITY*** pipe are particularly attractive.

Major economies are regularly effected in fabrication and installation . . . using the longer units – up to 50 feet. Ultrasonic testing of all ***HIGH INTEGRITY*** pipe – combined with the more conventional test methods – assures uniform, dependable, specification quality of delivered product.

Curtiss-Wright's Metals Processing Division maintains qualified engineering personnel at all branch offices, available for design consultation and specification pricing.

80 GRIDER STREET

METALS PROCESSING DIVISION

CURTISS-WRIGHT (C W)

CORPORATION • BUFFALO, NEW YORK

METALS PROCESSING DIVISION BRANCH OFFICES: . . . . . NEW YORK • HOUSTON • LOS ANGELES

PRODUCTION MACHINERY

GREENLEE

TOMORROW'S MARVEL OF THE ROAD . . .
TODAY A BIG, TOUGH JOB FOR PRODUCTION

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Photo Courtesy of Z & W Machine Products, Inc.

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Leading producers of thousands of high-quality screw machine products have made Youngstown Cold Finished Bars their regular specification for long trouble-free production runs. That's because they're quality-controlled throughout all production phases from ore mine to cold finishing.

They possess the best chemical composition, physical structure and surface conditioning—a result of Youngstown's half-century of steelmaking know-how. For improved machine finishes and increased tool life at greatly increased machining speeds, always specify Youngstown—your best assurance of quality and product uniformity.

For additional help or information call our nearest District Sales Office today—or write directly to our Home Office.

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SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio
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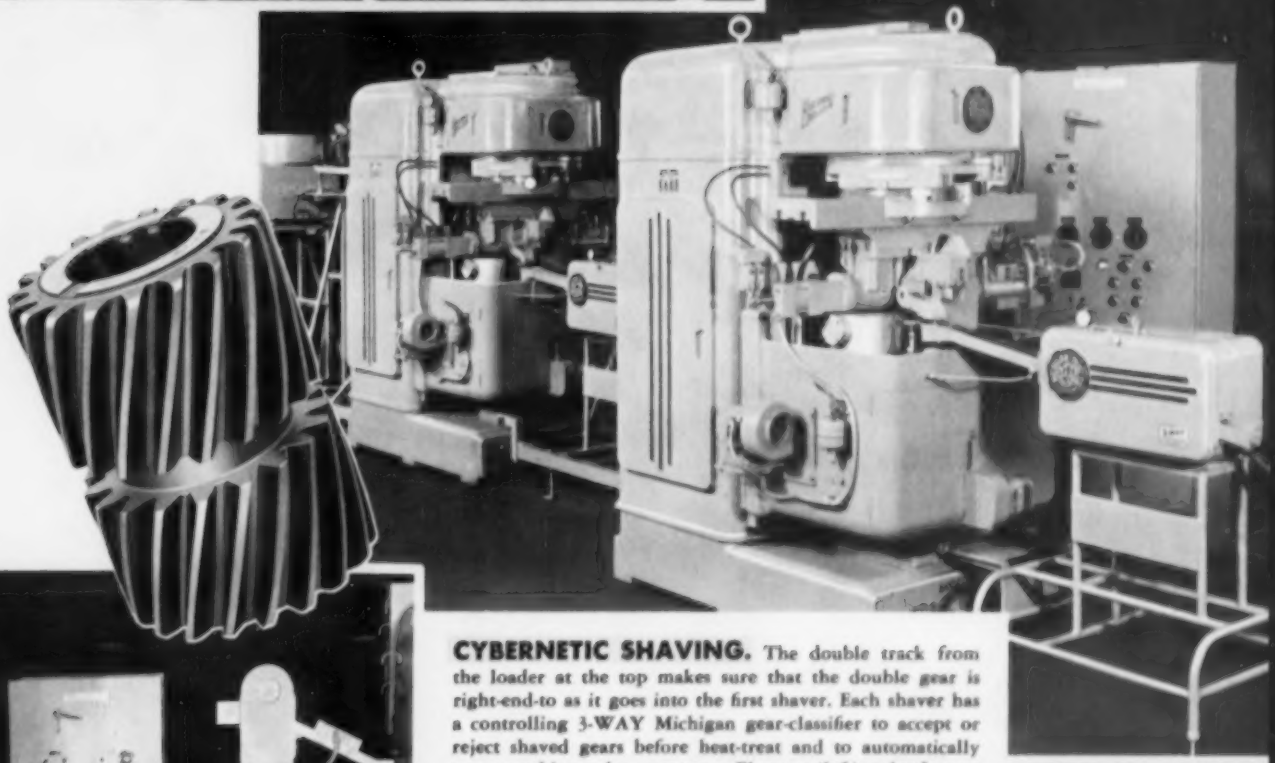
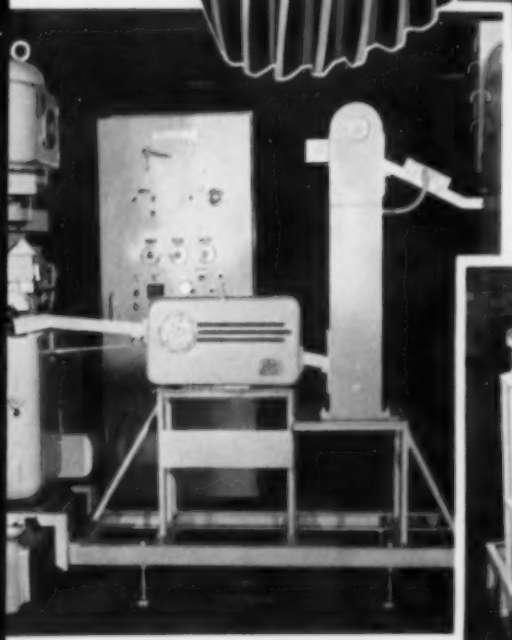
This Month's

GEAR PIX



CYBERNETIC SHAVING. The double track from the loader at the top makes sure that the double gear is right-end-to as it goes into the first shaver. Each shaver has a controlling 3-WAY Michigan gear-classifier to accept or reject shaved gears before heat-treat and to automatically re-set machines when necessary. Elevator (left) re-loads gear into shaver #2.



FULLY AUTOMATIC SOUND TESTING follows heat-treat. These Michigan speeders (right) with tunable electronic audio-pickup eliminate variable human element in sound testing. Can be set to reject gears for excess noise in any desired pre-selected frequency band.

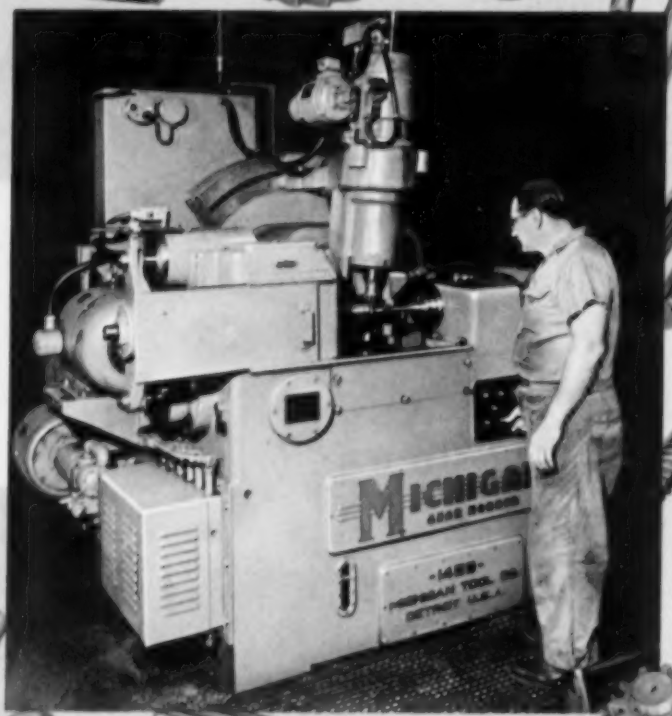
MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO., LTD.

This Month's

GEAR PIX



105 PARTS HOBBED ON JUST 3

Ultra-Speed hobbers regularly by a major lift-truck producer. Shows how high production machines can be used effectively for shorter runs. Hobbing is mostly at 250 sfpm (SAE4185) with far longer hob life and number of parts per grind. Change-over averages about 1½ hrs. (same as previously).

MICHIGAN TOOL COMPANY

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Power TO MOVE A WORLD!

➔ America stands on the threshold of a golden age. The sinews of her dynamic economy are flexed as never before. Increased power for untold requirements will be needed . . . and *met* by the most dependable supply of low-cost energy—*Bituminous coal!*

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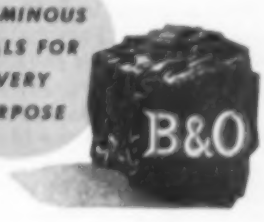
BITUMINOUS COALS FOR EVERY PURPOSE



METALWORKIN
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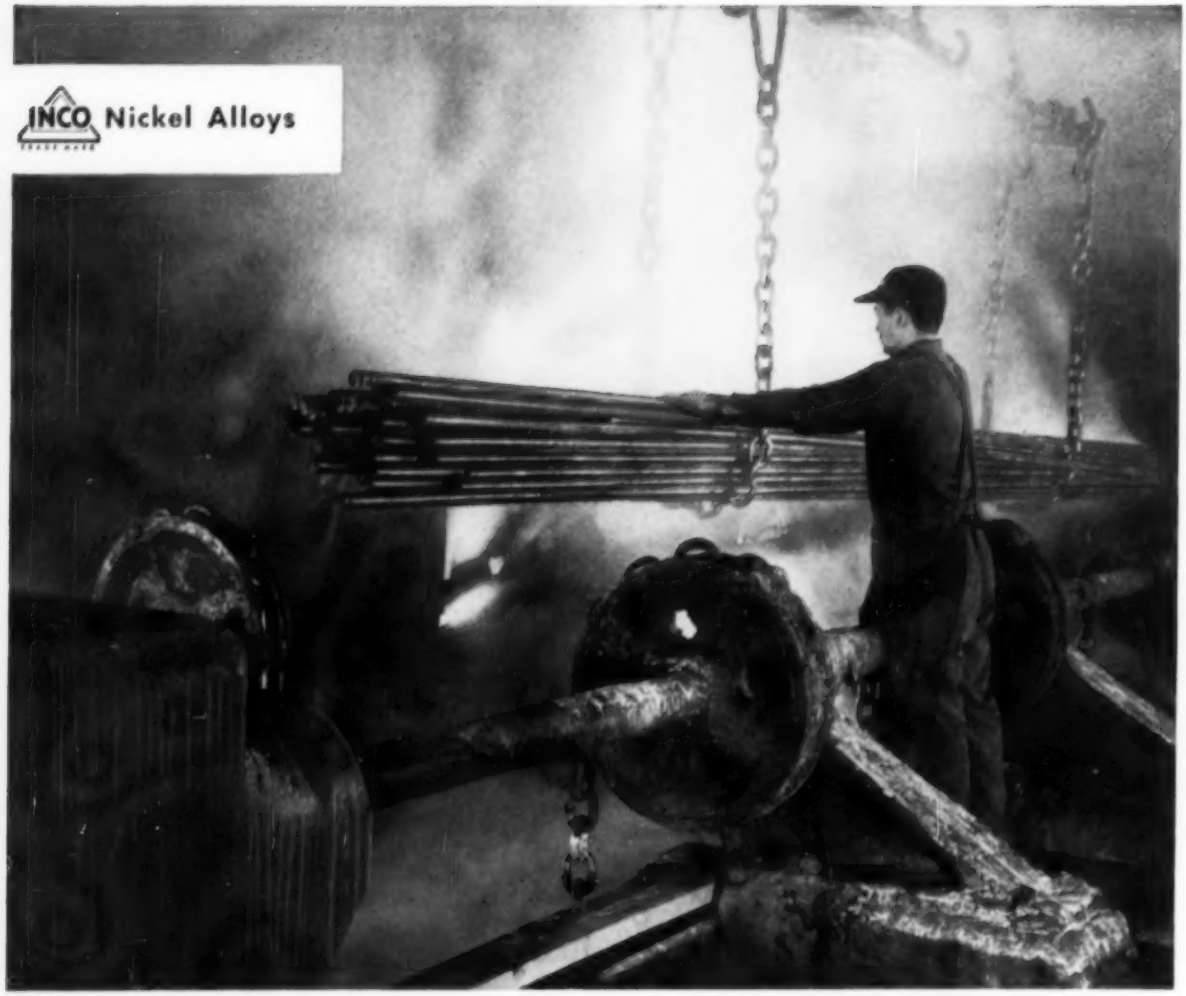
METALWORKIN



These Monel sling chains rest in the bath while special tool steel bar stock is pickled at Superior Drawn Steel Company, Monaca, Pa. Tough Monel chains safely carry these heavy loads, year after year, through the 180°F. 8% sulfuric acid solution.

Five-year-old pickling chains...

still going strong because they're Monel

These sling chains of Monel* nickel-copper alloy have gone into this 8% sulfuric acid bath *thousands* of times. They have thousands more trips left.

They're the second set of Monel sling chains used by Superior Drawn Steel Company. They make cold finished steel bars, wire and shapes. The first set lasted more than five years before a few links started to go. Easily rebuilt with new Monel links, these chains were soon back in service . . . years of safe performance added with a minimum of expense.

And the Monel chains shown above will apparently do even better.

This is how you can expect pickling chains to last—if they're Monel! Monel gives long service in most pickling equipment. Use it for your tie-rods. Your pickle pins. Your eyebars. Your pipes. Your baskets. Even the nails in your pickling tank walls!

The more ways you use Monel in your pickling operations, the more money you can save.

See in detail how it's done. Get the 32-page Inco booklet, "Equipping the Pickle House for Greater Production at Lower Cost." Write *today*.

*Registered Trademark

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

Monel... *for proved pickling life*

STEEL

Metalworking Outlook

October 15, 1956

Business Weather: Fair, Clear

Here are three major indications that business weather is unusually sunny: Gross national product is now running at a $414-billion annual rate, compared with a $408-billion rate just four months ago; personal income in August spurted to a yearly pace of $328.2 billion; nonfarm employment reached a record high of 52.1 million in mid-September.

Coal Prospects Better

Soft coal business is improving. Watch for production of about 525 million tons this year, compared with 465 million last year and 392 million in 1954. United Mine Workers' president, John L. Lewis, told delegates to the UMW convention that production may reach 1 bil'ion tons by 1975. Expanding exports account for part of the increase, especially of metallurgical grades. The foreign demand for that quality will reach 35 million tons this year, may hit 50 million by 1958 and 100 million by 1962.

Memo on Labor

Don't expect the coal miners' settlement ($2 a day in wages and 40 cents in fringes) to set any pattern for other industries. But it will put still more pressure on the trend upward in wage grants . . . Look for the United Auto Workers to make little headway in its attempts to get the auto companies to consent to reopening their contracts about 18 months early . . . Merger of National Independent Union Council and Confederated Unions of America—two loose groups of independents claiming total membership of about 6.5 million—has been delayed until early next year . . . Significant agreement negotiated between Armour & Co. and the United Packinghouse Workers and Amalgamated Meat Cutters: Any employee displaced by a machine or new process will be paid a separation allowance.

The Public's Opinion on Bigness

Dr. Claude Robinson, president of Opinion Research Corp., reports these findings about the public's reaction to big business, big labor and big government: 65 per cent think big business is under control, and only about 25 per cent believe it's out of control. Some 46 per cent say problems of bigness are greatest in big unions, 16 per cent in big government and 16 per cent in big business. And 79 per cent approve businessmen in government, but only 39 per cent approve of union leaders in government. Only 25 to 30 per cent would like to see unions grow stronger, but about 65 per cent believe unions have grown large enough. The public samplings show that 68 per cent think it bad for the labor unions to cast their lot with the Democratic party; 61 per cent of union members agree.

Fewer WOCs in Government

For a while the Commerce department may use fewer WOCs (businessmen working for the U.S. without salary compensation), relying on consultants

Technical Outlook—p. 119 Market Outlook—p. 161

to keep posted on happenings in defense-related industries. Reason: It's cheaper to have consultants. WOCs draw per diem when in Washington and can get government-paid transportation home on week ends.

Jet Transports Ahead?

Civil Aeronautics Administration officials apparently were pleased with their first experiences with the Boeing 707 jet transport. Maneuverability and low-speed handling characteristics were favorably commented upon, and, with airways improvements coming under CAA's three-year plan, the jet should fit into air traffic with a minimum of trouble.

Republic Steel Notes

Republic Steel Corp. will need $2.5 billion for the steel expansion it plans over the next decade, compared with $25 billion required for all the steel industry . . . The company plans an $8-million construction project at Canton, O., for its titanium facilities . . . It's booked through October, 1959, on big pipe for transmission lines . . . Republic has expanded its capacity to produce pipe and tubular goods by 27 per cent since 1946.

Aid to Foreign Steel

Direct and indirect financial assistance amounting to $866.2 million has been provided by the U.S. government and the World Bank to 24 foreign countries since 1940 for expansion of iron and steel. Business & Defense Services Administration points out that, while the American steel industry hasn't invested in plants abroad, it has contributed substantial benefits at local level through development of iron ore mining and other facilities. As a result, U.S. imports of iron ore in 1955 reached 26.3 million net tons, compared with 2.8 million in 1940.

Light Metal Capacities Rise

Watch for aluminum-smelting capacity to increase 119,000 tons in 1956, to a total of 1,728,500 tons by the end of the year. Added capacity of 764,500 tons is expected during the next two years. And another light-metal industry shows even more spectacular possibilities. Consumption of magnesium may increase 14 per cent per year through 1975. Production of the primary metal exceeded 61,000 tons last year.

Straws in the Wind

Louis E. Wolfson is trying to sell his Highway Trailer Co., Marion Power Shovel Co. and Marion's subsidiary, Osgood Co. . . . Roadbuilding industries should begin to feel the full effect of the federal highway program this winter . . . Sales of power-type roof ventilators for big buildings (power driven air-handling devices to exhaust air) have climbed from virtually nothing in 1946 to some $15 million this year . . . Truck operators, as well as railroads, are considering a 15 per cent increase in freight rates . . . Lukens Steel Co. proposes to raise its authorized debt limit from $7 million to $50 million to provide funds for expansion . . . Armco Steel Corp. has filed a fast tax write-off request for its $42 million expansion at Middletown, O.

NOW —

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ARISTA	CRAB ORCHARD
LAMAR	LOUISVILLE
MacALPIN	TAMS
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NEW YORK 4, N. Y. 17 Battery Place Tel.: Bowl'g Gr'n 9-2170	PORTSMOUTH, N. H. Gosling Rd., Box 478 Tel.: Geneva 6-4120	PROVIDENCE, R. I. 1141 Hosp. Trust Bldg. Tel.: Gaspee 1-8500	RICHMOND, VA. Central Nat. Bk. Bldg. Tel.: Richmond 2-9066

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SPECIAL ARMCO STEEL protects radar equipment in Arctic

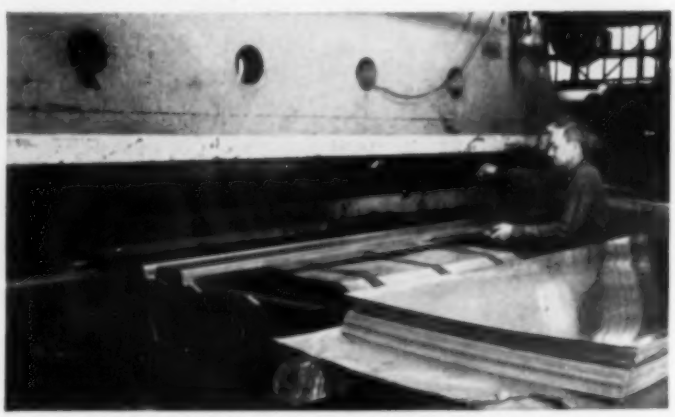
Winter is really never over in the Arctic where this radar tower and others like it stand. That's why the metal for these towers must be weather-resistant . . . the paint-on-zinc finish tight and long lasting. And that's why the tower manufacturer fabricates panels and top deck from special Armco ZINCGRIP® PAINTGRIP® Steel.

Even the severe deep-rib forming of side panels doesn't peel or flake the tightly-adhering zinc coating on this special steel. What's more, panels made from Armco ZINCGRIP PAINTGRIP Steel sheets take paint immediately, hold it longer because they're mill-Bonderized.

18-Year Record

Drawn and severely formed parts of all kinds have been made from Armco ZINCGRIP PAINTGRIP for more than 18 years. It was the *first* hot-dip zinc coated steel sheet that could be severely formed or drawn, then painted without pre-treatment.

Men and costly equipment are housed in this compact Arctic radar tower. About six tons of Armco ZINCGRIP PAINTGRIP Steel sheets are in each 50-foot diameter tower. (Tower fabricated by Dresser-Ideco Company, Columbus, Ohio, one of the Dresser Industries. Radar equipment shown was developed by the Heavy Military Electronic Equipment Department, General Electric Company, Syracuse, N.Y.)



Two-inch by two-inch corrugations are formed in Armco ZINCGRIP PAINTGRIP Steel sheets with no damage to the zinc coating. These side panels are painted before erection. No pre-treatment is needed before painting.

ARMCO STEEL CORPORATION

2226 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

The Promising Farm Market

In the political controversy over the farm vote, the impression is easily gained that agriculture is decadent; that its importance as a market for metalworking is diminishing. Nothing could be farther from the truth. Let's look at some of the facts:

The secretary of agriculture is required by law to support five basic crops (corn, wheat, rice, cotton and peanuts) at 75 to 90 per cent of parity, depending on the supply on hand. Supports also are provided for dairy products and certain feed grains. Parity is what the money from the sale of these products would have purchased in the 1910-1914 period.

As a result of these subsidies, government stockpiles of surplus farm products climbed to $9 billion. The storage bill was $1 million a day. Prices received by farmers declined. Prices paid for the things they needed went up. The chief beneficiaries of the subsidies are the 2 million larger mechanized farms. The 3 million smaller ones don't fare so well.

Farms are getting bigger. Now averaging 242 acres each, they're more than twice as large as they were 35 years ago, an eighth larger than they were five years ago. In the last five years, 600,000 farms have disappeared. The market value of farm land has reached a new high of $103 billion, up $4 billion from 1955. More farmers own their own farms.

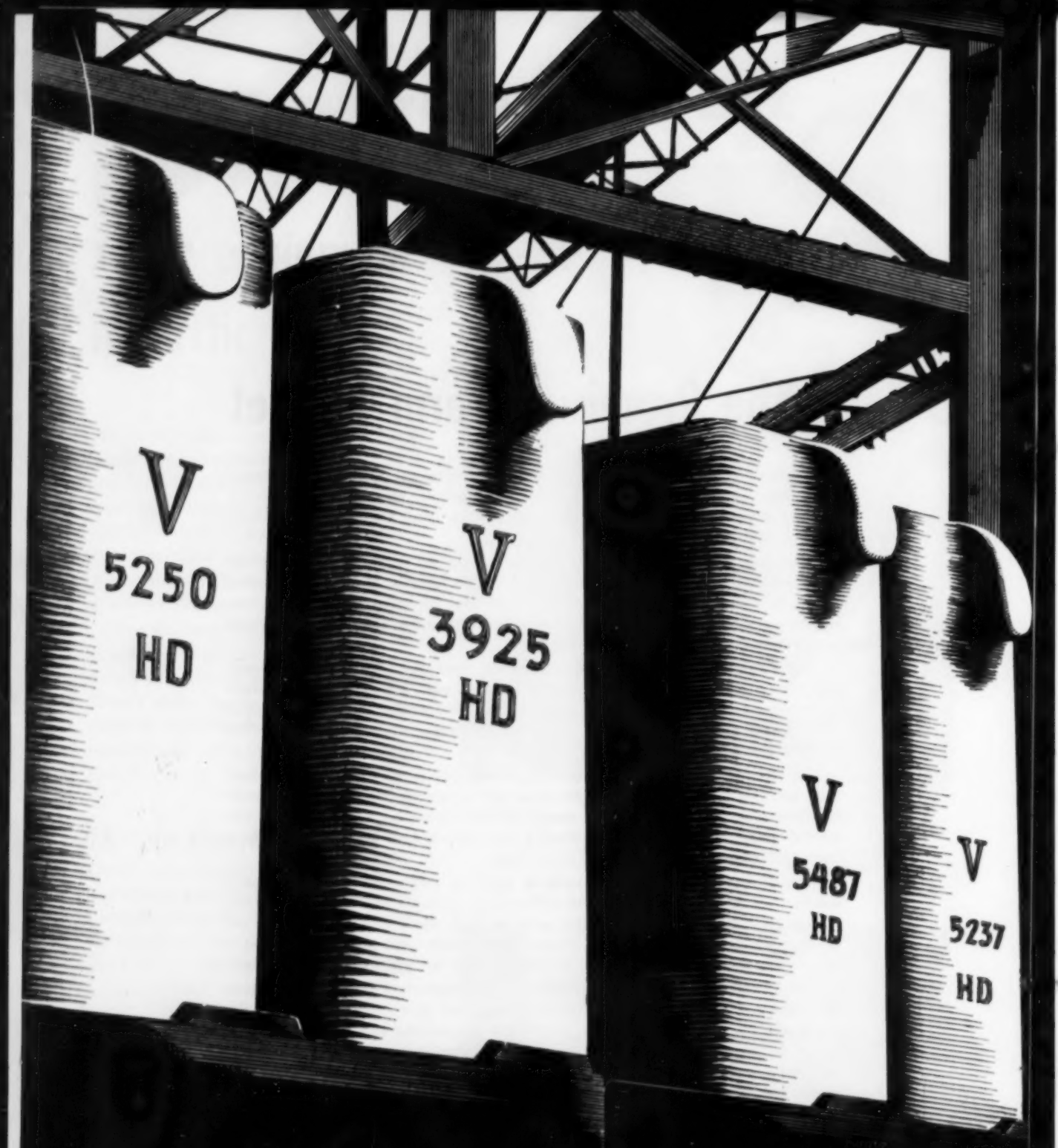
As one approach to the problem of avoiding surpluses, the government's soil bank program will withdraw 12 million acres of unneeded land from cultivation in 1956, 40 million to 50 million acres in 1957. Another is a program to encourage wider use of agricultural commodities in industrial products. A third is the rural redevelopment program started in 1955 to help low-income farmers.

Mechanization has made it possible for the progressive farmer to get along with less hired labor. Equipment such as deep well pumps for use in normally moist areas and dryers for newly mowed hay are helping him lick the vagaries of the weather. He likes new equipment such as combination corn picker-shellers and automated lines that grind and deliver the right amount of feed to livestock. He likes the same home appliances as his big-city brothers.

The position of the farmer is definitely on the mend. Translated into farm equipment sales alone, it means that he will spend $1.6 billion in 1957, compared with $1.4 billion in 1956. Other billions will go for the thousands of "hard" items needed on the farm.

Plan for your share of the promising farm market in 1957.

Irwin H. Such
EDITOR-IN-CHIEF



VALLEY MOULD AND IRON CORP.

General Offices: HUBBARD, OHIO

Western Office: Chicago, Ill. • Northern Office: Cleveland, O.

On plant relocation and new sites:

"The key to the future may be in dispersal from already highly industrialized regions."—James E. Jones, industrial development division, Appalachian Power Co., Roanoke, Va.

On the engineer and scientist shortage:

"We need five enthusiastic engineers to help us keep growing. Sit down and talk."—Sign at booth of NRC Equipment Corp., Newton Highlands, Mass.

On significant component developments:

"The missile and rocket program has brought us gears and bearings to withstand temperatures of 1100 to 1200°F."—Robert W. Miller, metallurgist, Electro Metallurgical Co., New York.

On heat treating developments:

"We are impressed with a new induction furnace being exhibited here. In melting, I've seen an aluminum tapping and pumping furnace."—H. G. Tarracks, assistant chief metallurgist, Truck & Coach Division, General Motors Corp., Pontiac, Mich.

On creativity in industry:

"The creative man needs growing room. He needs recognition as well as pay. He needs to know departmental as well as project goals. Cage him too tightly and his creativity dies, or he accepts that offer in California."—C. M. White, chairman, Republic Steel Corp., Cleveland.

On the future of the Mesabi:

"We're breaking ground in Superior, Wis., for a plant to produce grinding balls to form taconite pellets."—Fred W. Genger, assistant manager, automotive sales, National Malleable & Steel Castings Co., Cleveland.

On the year ahead for autos:

"It will be a hell of a good year."—Executive, supplier to automotive industry.

On the future of plastics:

"After irradiation, some plastics possess some qualities of steel."—C. F. Thompson, Nuclear Systems, division of Budd Co., Philadelphia.

On ultrasonic cleaning methods:

"Three years ago at this show we had the first conveyorized ultrasonic equipment. Now there must be at least eight firms exhibiting such equipment."—S. E. Jacke, research & development engineer, Detrex Chemical Industries Inc., Detroit.

Taking Metalworking's Pulse

With over 50,000 metalworking executives on hand at the National Metal Exposition last week, STEEL's editors found a ready-made symposium on the industry's problems

INDUSTRY shifted its search for new methods, new materials and new men to the American Society for Metals' show in Cleveland last week. The consensus: Those problems will be licked, but certain areas need more concentrated attention by metalworking's top executives than they have been getting.

Keynote—Perhaps you can put Republic Steel Corp.'s chairman, C. M. White, down as the keynoter. Speaking on trained manpower for a technical age, Mr. White faced up to the problem of bringing more people of imagination into the industry at a time when it most needs them. Citing the shortage of engineers and scientists, he said: "No reshuffling of personnel, no emergency recruitment program, no short term measure is going to bring about any real relief for our trained manpower shortage."

Seen in the aisle of the exposition: A sign requesting engineers to stop in and talk about job openings (see quotations above).

Topics from automation to zirconium were discussed whenever STEEL's editors buttonholed show visitors.

The Need — To the question, "Why are you here?", Gail P. McCleary, research engineer, Thompson Products Inc., Cleveland, replied: "To find new methods of metal processing." Mr. McCleary sees the big technical developments of the future in metal forming rather than metal cutting.

Noted Fred McKenney, general foreman, Cramet Inc., Chattanooga, Tenn.: "Our most serious

problem is getting the right equipment to do a job for us." Sam A. Gordon, consultant, Battelle Memorial Institute, Columbus, O., expressed some surprise at the extent of automation's part in the show, and pointed to metal removal as the area where technical developments of the immediate future must come.

Believes J. Alfred Berger, professor and head of metallurgical engineering at University of Pittsburgh: "Developments in the fabrication of titanium need to be pointed out to students preparing for careers in metalworking."

Economics—Savings on the production line were topics of importance, of course, at a time when a lower ratio of profits to sales is a major problem. "There will be a big increase in the use of prefinished metals," said V. P. Bartelimo, Naugatuck Chemical Division, U.S. Rubber Co., Naugatuck, Conn. "The high styling potential and unlimited coloring possibilities of vinyl film and sheet assure the growth of plastic covered metals," he concluded.

The rising cost of raw materials is the most serious problem of the industry, said J. E. La Belle, chief metallurgist, Detroit Diesel Engine Division, General Motors Corp., Detroit. He cited high temperature alloys and new casting processes as significant developments. J. B. Smith, president, Pipe Line Development Co., Cleveland, also expressed interest in casting, specifically the centrifugal method.

Material handling was the most serious consideration of Donald G. Redmond, methods engineer, Westinghouse Electric Corp.

Better Sales—Although the exposition was a production show, at least one man attended with sales problems on his mind. Reported Robert W. Miller, metallurgist, Electro Metallurgical Co., New York: "I'm here to help our sales personnel answer technical questions which they may not be able to handle." From all reports, salesmen are coming to have more technical knowledge, or else they are working in teams with engineers.

Such a situation (sales minded engineers) seems to be increasing as metalworking moves more into atomic and ultrasonics problems, among others.

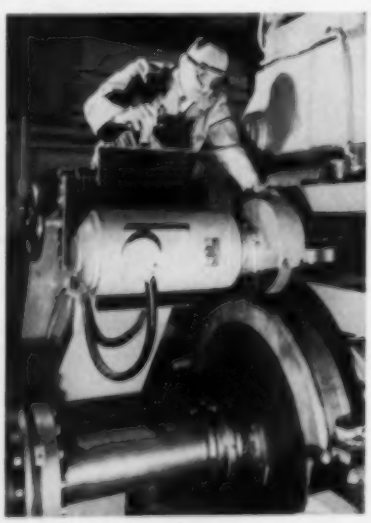
Labor Wants More

Industrial relations experts tell what's coming up in way of union demands. Management must act in the "balanced best interests of all," advise speakers

LAST WEEK in Cleveland more than 500 metalworking executives took a look at some future problems in labor relations. The occasion was the ninth annual fall conference of the Associated Industries of Cleveland.

Sums up AIC: "The right to manage can be lost. Some companies have already lost it. Others are drifting into the danger zone where their rights to determine production, price and capital investment will be in question."

More—The four-day week is already on the slate as labor's next major demand, believe speakers and delegates. To predict the future demands, they suggest you consider why people want money. Money is needed for sickness—the unions negotiate sickness benefits. Money is needed for old age—the unions negotiate pension plans. Money is needed for unemployment protection—the unions negotiate Supplementary Unemployment Benefits.



Put to the Test

More durable railroad car wheels and axles with improved mechanical design may be developed through experiments being conducted on this giant machine. It tests car wheels and axles at U.S. Steel Corp.'s new Research Center at Monroeville, Pa.

People also save to buy houses and educate their children. So, industry will hear demands to provide for those wants. Other possible bargaining areas include supplementary social security benefits.

Merger—Speaking on the "Meanings of the Merger," Carroll R. Daugherty, chairman of the Division of Business Economics, Northwestern University, pleaded for better management-union relations.

Companies must convince union leadership and membership of two things, he said. First, that the company is not out to undermine or weaken the union. Second, that the company is sympathetic and constructively responsive to labor's needs and problems. If these attitudes are established, believes Mr. Daugherty, "management, when it has to, can say no and be believed and respected." Otherwise, he thinks it inevitable that the unions will turn more and more to political action to gain their ends, with concurrent threats of government control in labor-management problems.

Confirmation — Other speakers and panel members, including top industrial relations executives from General Electric Co., American Motors Corp., Detroit Gasket & Mfg. Co., and Thompson Products Inc., agreed.

Walter G. Koch, president of International Steel Co., Evansville, Ind., pointed out that a truly creative management can get the best both from supervisors and workers if it trains them to make decisions at their level.

Tribute—AIC's industrial relations conferences are fast gaining recognition in metalworking circles. This one drew executives from all parts of the U.S.

One significant note — General Electric sent line foremen from three Cleveland plants to the complete program. Said one: "The company realizes that we're on the firing line. The meeting has given me a completely new insight into my relations with the men."

Wheelabrator Corp.

Foundries Mechanize More

Equipment makers are increasing their sales to foundries as extended prosperity loosens purse strings. The demand is for equipment to meet competition and cut labor costs

MAKERS of foundry equipment are in an enviable position. Einar A. Borch, chairman of the Foundry Equipment Manufacturers Association's statistical committee, puts it this way: Orders are up; production will increase; and though backlogs are lengthening, they are not so extended that they discourage more orders.

The Run Down—Sales so far this year are running about 7 per cent ahead of last year's. They promise to be even better next year.

Since the first of the year, backlogs have increased 10 to 15 per cent. Monthly shipments are higher than last year's, but have not reached the levels of the new orders coming in. The experience of a Cleveland equipment maker is typical: His sales are up over 1955's, and shipments will pass last year's total before the end of this quarter.

Credit — Medium and large foundries, particularly automotive, are the big buyers of equipment. Most of their purchases are financed from profits and reserves.

Although the volume of requests for credit terms by smaller foundries is higher than it has been in two or three years, equipment makers aren't worried. Their emphasis is on the extended period of good business and profits the foundry industry has enjoyed. Companies with the biggest increases over 1955, says Mr. Borch, are those which make a large portion of their sales to the medium and small foundries.

Expansion activity reflects this good business. About one-third of the 60 FEMA members expanded or modernized their plants this year. Next year, around 25 per cent will add to facilities.

Prices Up — Equipment prices have gone up 5 to 10 per cent in recent months. One maker reports hikes of 20 per cent on automated equipment which uses many engineered components.

The Trends — Despite the high cost of automated equipment, demand is increasing. E. A. Rich, general sales manager, Wheelabrator Corp., Mishawaka, Ind., says the rise in labor costs and the competitive casting market are pushing the long-term trend in sales of foundry equipment upward. John M. Kane, American Air Filter Co. Inc., Louisville, says the trend should follow the expected increase in gross national product.

Foundry Automates Annealing

Early next year, Marion Malleable Iron Works, Marion, Ind., will install automated heat treating equipment for continuous annealing of regular and pearlitic malleable iron.

The new electric furnace represents the first step in a four-year modernization program which is expected to boost the firm's production to 2400 tons a month.

General Electric Co.'s Industrial Heating department is building the 190-ft roller hearth furnace, reheat furnace, oil quench tank and automatic handling equipment.

Acetylene Plant for Texas

Diamond Alkali Co., Cleveland, will start construction on a multimillion dollar acetylene plant at Houston next fall.

This is an open pit jasper mine. The rocks are the jasper, containing 40 to 44 per cent iron. Jasper is so hard that a jet piercer (atop the rocks) is used to drill blast holes. Trucks carry 34 tons at a time to a crusher and concentrating plant

Iron Ore Has a Successor

ANOTHER material to take the place of the diminishing reserves of direct shipping iron ore is ready for use.

It's iron-bearing pellets made from Michigan's jasper, a hard rock with a 40 to 44 per cent iron content.

The pellets (63.5 per cent iron, 7.5 per cent silica, 2 per cent moisture) are a product of the Marquette Iron Mining Co., owned by Cleveland-Cliffs Iron Co., Cleveland; Jones & Laughlin Steel Corp., Pittsburgh; International Harvester Co., Chicago; Wheeling Steel Corp., Wheeling, W. Va.; and Inland Steel Co., Chicago. Cleveland-Cliffs, which owns 47.5 per cent of the stock, operates the mine and plant.

The first shipment (4500 gross tons) of jasper pellets left Marquette, Mich., by boat Oct. 3 for International Harvester's Wisconsin Steel Division, South Chicago, Ill.

What They Mean—Jasper pellets are to Michigan what taconite pellets are to Minnesota: An outlet for their incalculable tonnages of rock containing small amounts of iron, and assurance that their minerals industry will not wither with the diminution of supplies of direct shipping ores (ores which can be shipped without processing).

Jasper for the pellets comes from an open pit at Republic, Mich. (on the Marquette iron range), about 35 miles southwest of Marquette. It is crushed into dust so that the iron particles are released. A flotation process separates iron from waste material.

Step Two—The powdered iron is shipped by railroad to Eagle Mills, Mich., 7 miles southwest of Marquette, for pelletizing. From Eagle Mills, the pellets can be hauled by rail to Marquette (on Lake Superior's south shore) for loading into lakes vessels. Or by less direct route, the pellets can be taken by rail to Escanaba, Mich., on Lake

Michigan's north shore for loading into lakes vessels. There's talk of construction of a rail route direct from Eagle Mills to Escanaba. This would eliminate going through the Soo locks (a vulnerable spot in wartime). For water shipment to Chicago, Escanaba is a much closer loading point than Marquette.

The Republic crushing plant, which may be expanded, can turn out 600,000 tons of iron concentrates a year.

Change in Times—Most of the iron ore mines on the Marquette range are underground, where a high-grade product is found. Top-of-the-ground ore of good quality was limited, and it was removed long ago. Now, they're going after the material of lesser quality. This has become economically feasible because of the waning of domestic ore supplies and the increase in ore prices.

The Republic mine area was worked as early as 1871—last shipment of direct ore was made in 1937. The lands lay idle until November, 1947, when a diamond drilling program to test the iron formation for metallurgically treatable material was undertaken by Cleveland-Cliffs. It showed much promise.

Four-Year Project — Construction of the facilities began at Republic in late 1952. The open pit mine started operations in April, 1956. The Eagle Mills pelletizing plant began operating in September.

The pelletizing plant was placed at Eagle Mills because this point is considered the most economical meeting place for the raw materials it needs (iron concentrate, bentonite, limestone and coal) and because it is convenient to other prospective jasper mines and to lake shipping facilities.

Floating Iron — Because jasper is nonmagnetic, it's impossible to use a magnetic process to extract the iron particles from the crushed jasper. A flotation method is used. Fatty acids help produce a froth. Flakes of iron attach themselves to air bubbles in the froth; the bubbles rise; and the iron particles are skimmed off the top. Collectively, they're known as concentrate, which next is pelletized for use in blast furnaces.

How Top Pay Stacks Up

$87,000 was paid in wages to the average top officer last year, and other types of compensation gained popularity. But the tax bite is high, spurring indirect benefits

BY MOST standards, top executives are in a pretty good spot as far as earnings are concerned, reveals a study by National Industrial Conference Board, New York.

The average top officer among 903 companies in 28 industrial groups received $87,000 last year. His second in command received about seven-tenths as much, and the third highest paid man somewhat under three-fifths.

Relationships—Pay of first officers for primary metal manufacturers ranked second high in the survey. The average top man received $118,000. Rubber companies paid the most—$140,000 average. The lowest metalworking industries were miscellaneous manufacturing and construction.

But, points out the survey, many of the industries that paid the lowest average remuneration to their first officers paid their second men proportionately more than the average.

Size — As would be expected, larger companies paid their officers more than those with lower net sales. Again, though, plenty of exceptions turned up. For example, the average top pay for companies with annual sales between $180 million and $209 million was $114,000. The average for companies in the next highest sales class, $210 million to $239 million, was $110,000.

Not included in any of these payments are indirect compensation plans. Nine-tenths of the reporting companies state that their executives are included in pension plans; 43 per cent report incentive bonus plans, and 40 per cent report stock option plans.

Grim Reaper—Uncle Sam took at least a third of the gross earnings of the officers included in the report. A substantial portion would pay half, and the top earners considerably more.

The typical $50,000 man, says NICB, paid $16,000 in taxes. The $100,000 man paid $43,000. The $500,000 man paid $327,000. These punitive tax rates, points out NICB, are the major reason for the growing popularity of indirect benefits.

What Top Executives Make

BY INDUSTRY		BY COMPANY SIZE	
		Company's Sales	Average Pay
Primary Metals	$118,000		
Transportation Equipment	99,000	$ 0-$29 million	$52,000
Electrical Machinery	90,000	30- 59	70,000
Machinery	87,000	60- 89	84,000
Instruments	85,000	90-119	92,000
Mining	78,000	120-149	99,000
Fabricated Metals	77,000	150-179	109,000
Miscellaneous Mfg.	63,000	210-239	110,000
Construction	56,000	300-999	147,000
Average, All Industries	87,000	1000 & over	211,000

National Industrial Conference Board

Metal Tube Market Grows

YOU'LL SQUEEZE your dinner from collapsible metal tubes in a few years if producers continue the trend to pack more food products into these convenient containers.

Metalworking already sells folding tubes to shippers of peanut butter, jelly, cake frosting, mustard and catchup, but, like Walter and William Schroeder, co-owners of Michigan Collapsible Tube Co., Detroit, they think the industry is just beginning to explore potential uses for foodstuffs. "Europeans are packing more food in tubes than we. The trend is just beginning in the U.S.," say the Schroeder brothers.

More Aluminum—Product managers at Aluminum Co. of America, Pittsburgh, point out that aluminum's share of collapsible tube production increased from 7 per cent in 1938 to 53.5 per cent in 1955. Alcoa officials agree that's just the beginning of the market.

More than food goes into the tubes: Alcoa sells them to producers of more than 15 different items. Do-it-yourselfers get plastic wood, cement and putty from the tubes; housewives can squeeze out cosmetics and shoe polish.

New Mark—Seventeen tube producers shipped more than 1 billion tubes last year from 20 production points. Shipments in the first seven months of 1956 jumped 13.5 per cent above those in the same period last year, says the Collapsible Tube Manufacturers Council, New York.

Tooth paste tubes count for one-half of production; medicinal uses take another 20 per cent; household and industrial uses about 17 per cent.

More Tin, Lead—Lead tube makers account for 31 per cent of all tube production and are finding increasing demands from adhesive and lubricant producers. Tin tube makers report growing demands from producers of foodstuffs and pharmaceutical products. Shippers of shaving cream and tooth paste are raising their requirements for tin coated lead tubes this year.

Despite aggressive competition from plastic tubemakers, metal tubemakers are certain 1956's sales will be 10 to 15 per cent better than last year's. The convenience and ease of handling metal tubes promise a growing market, they say.

Since 1946, aluminum producers have doubled their production of tubes, while tin and lead tube producers have done almost as much.

Beryllium Contract Awarded

Brush Beryllium Co., Cleveland, has been awarded a contract to supply 500,000 lb of reactor-grade beryllium to the Atomic Energy Commission over a five-year period starting in early 1958.

The company will build a $4.5-million plant between Elmore and Oakharbor, O., to handle the increased demand for the metal. Today, it is the only industrial producer of atomic reactor-grade beryllium. It operates the AEC's facility at Lackey, O., and has a fabrication plant in Cleveland.

AEC has also awarded a 500,000-lb contract to the Beryllium Corp., Reading, Pa.

Two New Plants for Rockwell

A plant in Porterville, Calif., and one in Kearney, Nebr., will be completed early next summer for Rockwell Mfg. Co.'s Meter & Valve Division. By the first half of 1957, the Pittsburgh company will have

added four plants in a year: A 100,000-sq-ft plant at Russellville, Ky., a 106,000-sq-ft plant at Statesboro, Ga., a 100,000-sq-ft building at Porterville and a 180,000-sq-ft facility at Kearney.

New Plant for Strip Copper

Hydrometals Inc., formed by the merger of Illinois Zinc Co. and Hayden Products Inc., will build a $4-million plant in Chicago to produce copper strip. A continuous process will make strip from copper scrap in less than a day.

J. S. Flory, secretary-treasurer, says Hydrometals plans to build a similar plant in Los Angeles.

Reynolds Adds to Cable Mill

An addition to Reynolds Metals Co.'s aluminum wire and cable mill at Sheffield, Ala., is nearly finished. J. Louis Reynolds, executive vice president, says the space will be used for the production of electrical conductors covered and insulated with Neoprene and polyethylene.

General Cable Speeds Growth

An immediate 60 per cent expansion of General Cable Corp.'s manufacturing facilities in Tampa, Fla., is planned.

By early 1957, the recently opened plant will have equipment to draw copper wire and fabricate aluminum wire.

Distribution centers for its products will be built in Birmingham; Savannah, Ga., Miami, Jacksonville and Orlando, Fla.

Builds Steel Converters

Pennsylvania Engineering Corp., New Castle, Pa., will build two 65-ton top blown oxygen steel converters for Kaiser Steel Corp. at Fontana, Calif. The units will be built with one-piece shells.

Tait Invests in Expansion

An investment of $1.5-million in new machinery, expanded plant facilities and engineering research has been made over the last three years by Tait Mfg. Co., Dayton, O., says its president, Louis Wozar.

To Meet Demand

Ford starts aluminum casting plant near Reynolds' facilities; Kaiser builds a stretcher

INCREASED use of aluminum by the automotive and aircraft industries is speeding up the expansion programs of aluminum producers and fabricators. Kaiser Aluminum & Chemical Corp., Oakland, Calif., will add facilities for the production of plate to the sheet and foil rolling mill now under construction at Ravenswood, W. Va. Reynolds Metals Co., Louisville, will add 240 million lb to the annual capacity of its Listerhill, Ala., reduction plant.

Co-operation — About ¼-mile west of Reynolds' new facilities, Ford Motor Co., Dearborn, Mich., is building an aluminum castings plant. Molten aluminum will move from Reynolds to the Ford plant via a private road. Ford will use about 64 million lb a year after the Listerhill expansion is completed in late 1957 and Ford reaches full operation in late 1958.

Kaiser is speeding up its plans for Ravenswood to meet "the growing demand of the aircraft industry for high quality aluminum plate in increasingly larger dimensions in the strongest alloys."

Biggest Stretcher — Ravenswood's program will include a 144-in. plate mill, heat treating facilities, ultrasonic testing equipment and what is claimed will be the world's largest plate stretcher—it'll have a capacity of 20 million to 25 million lb, compared with the firm's Trentwood, Wash., stretcher, currently the largest (capacity, 10 million lb).

Reynolds' expansion consists of a new reduction plant at Listerhill with a capacity of 200 million lb and expansion of facilities by 40 million lb. When completed, Listerhill will have a total capacity of 340 million lb annually. Between 600 and 700 workers (annual payroll, $3 million) will be employed at the plant.

Ernest R. Breech, Ford's chairman, points out that the average consumption of aluminum per car has increased from 6 or 8 lb to 35 lb since World War II. Ford's new casting plant will produce 140 tons of aluminum engine and automatic transmission parts a day when in full operation. About 800 persons (annual payroll, $4 million) will be employed.

Nuclear Power by Mid-1960

This is a drawing of Dresden Nuclear Power station, to be built by mid-1960 on the Illinois waterway 50 miles southwest of Chicago. General Electric Co. is constructing the plant for Commonwealth Edison Co. and Nuclear Power Group Inc. The reactor will be housed in a steel sphere 190 ft in diameter. Construction will start next spring on the $45-million, 180,000-kw station, the largest all-nuclear power plant yet scheduled in this country

SEC Wants Stockholders To Have Pre-Merger Info

ANOTHER government agency has its eye on the merger picture. This time it's the Securities & Exchange Commission. Under a proposal to tighten its rule 133, certain mergers, consolidations and transfers of assets between corporations would no longer be exempt from the registration and prospectus requirements of the Securities Act. In addition, stockholder approval of the transaction would be required. The SEC feels that stockholders don't always get enough information about the deal. For firms listed on a national exchange (which already have to furnish proxy statements under commission rules), some provision would be made so information presented under a revised rule 133 would not be unnecessarily duplicated in the proxy statement. The commission will listen to interested persons until Nov. 2, then schedule public hearings or accept or reject the revisions. One interested group may be the Federal Trade Commission: That agency wants advance information on proposed mergers so it can halt illegal ones before corporate assets become scrambled.

Squabble Ahead on Housing

Watch for a congressional look-see into the housing situation. Sen. John J. Sparkman (D., Ala.) practically promised one to the Plumbing Fixture Manufacturers Association. Its aim presumably would be to find ways to help homebuilders without bringing on general inflation. But administration leaders have indicated that the housing industry is going to have to "grin and bear it" for a while. Housing Administrator Albert Cole says: "I cannot foresee any action on FHA and VA interest rates." (Legal limits on government-backed mortgages often make it tough to find takers for them these days.) Other top officials have implied that the curbing of inflation for the economy as a whole will be the approach to the credit situation—which apparently means no easing. But the situation is getting close attention, and with election just around the corner, some action shouldn't come as a big surprise.

Industry Gets Another Chance

The Renegotiation Board apparently still isn't sure of its proposed regulations on the exemption of standard commercial articles. The proposals have been put on the firing line again—industry will have until Oct. 26 to look at them. Several industry groups which have been critical of the board are eying the proposals but haven't had time to make up their minds. One possible complaint in sight: That the self-exemption feature may be too narrow, requiring many now-exempt firms to reapply for exemption. Over-all, though, the new proposals are generally considered an improvement over former regulations.

Tool Program Unimpressive

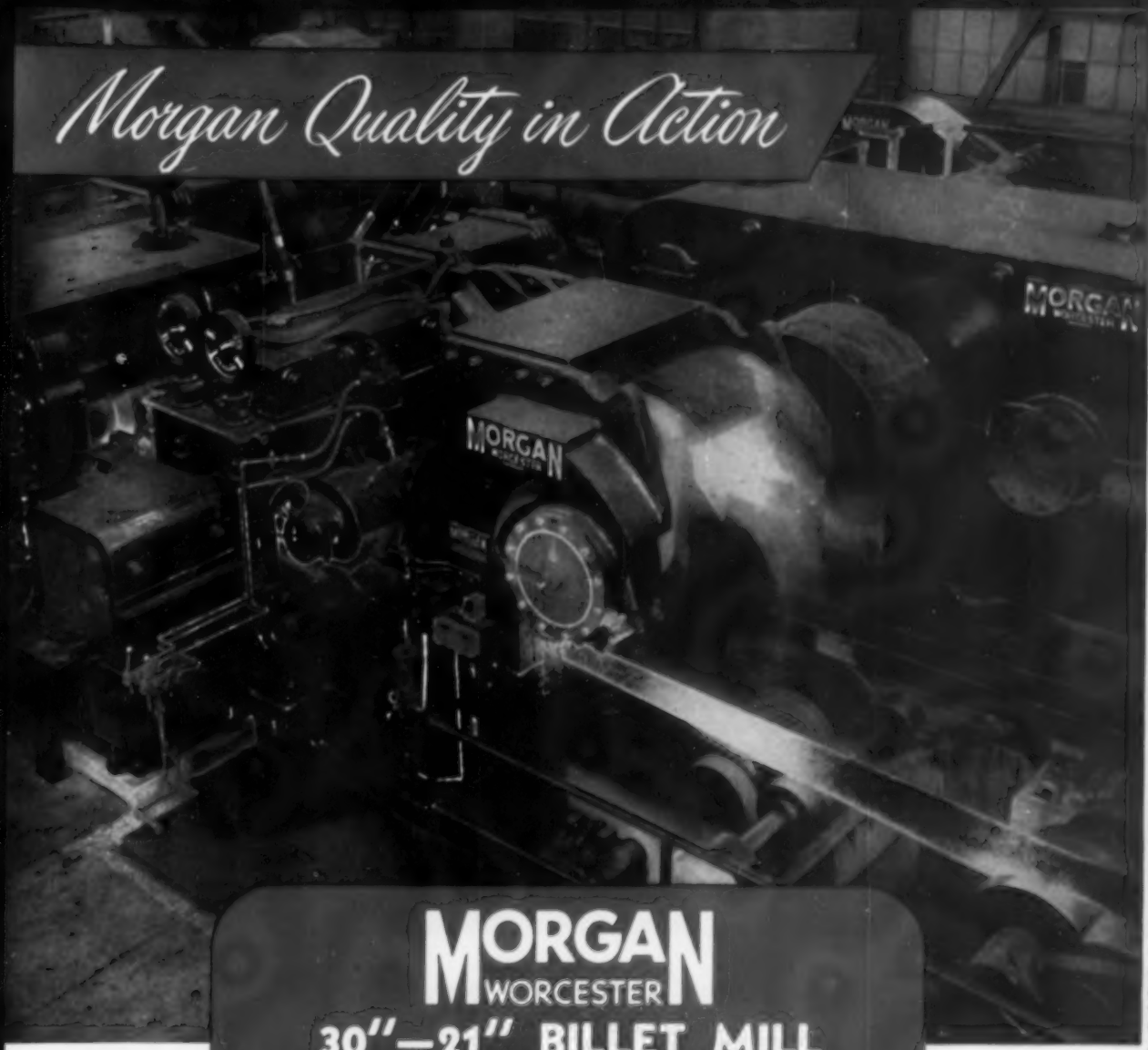
The Senate small business committee isn't particularly impressed by the Defense department's machine tool replacement program. Using the 5 per cent figure, the committee claims, it will take nearly 40 years to replace obsolescent tools. Industry's rate is pegged at 10 to 12 years. Another point made by the committee: A close watch should be kept to see that this "modest replacement program" acquires fully separate identity and is not encroached upon by long-standing facility maintenance and new requirements.

Reclamation Schedules Bids

The Bureau of Reclamation has scheduled bid calls for $306 million. Many of the projects will take several years to complete, but they are the backbone of a $174-million construction program in fiscal 1957. Equipment required ranges from huge electric generators to hardware and plumbing fixtures.

Meet Harold J. Vorzimere: A vice president of Federal Pacific Electric Co., Newark, N. J., he is on leave to serve as director, Electrical Equipment Division, Business & Defense Services Administration. He can be reached in Washington at Commerce department, Room 4114. Telephone Sterling 3-9200, Ext. 2175.

Morgan Quality in Action



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30"—21" BILLET MILL

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Every Morgan Mill is developed by highly skilled technical engineers to answer the exacting demands of mass production. Morgan introduced the first successful continuous rolling mill in this country—and has consistently maintained leadership in producing quality, high production mills in this country and abroad.

MORGAN CONSTRUCTION CO.

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Twenty-five tons in one bite!

This rugged Dravo-built ore unloader works around the clock at Pennsylvania Railroad's Greenwich Point pier in Philadelphia. A specially-designed man trolley operates the 25-ton bucket with the accuracy and speed necessary for efficient unloading.

For Pennsylvania Tidewater Dock Company, operators of the pier, this structure has meant smooth handling and increased capacity. A second ore unloader was ordered six months after the first one was installed.

Many users save time and trouble with Dravo heavy materials handling equipment. You'll find these barges and unloaders working at many of the nation's steel plants, power plants and other heavy materials transfer points. For specific help on such machinery or the other Dravo products and services listed below, write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

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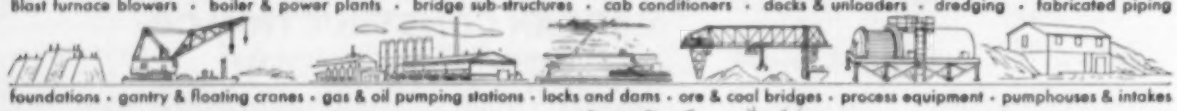
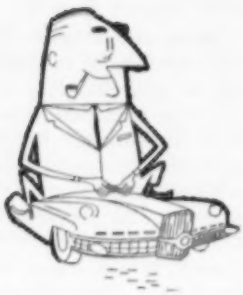


foundations · gantry & floating cranes · gas & oil pumping stations · locks and dams · ore & coal bridges · process equipment · pumphouses & intakes

river sand and gravel · sintering plants · slopes, shafts, tunnels · space heaters · steel grating · towboats, barges, river transportation



S-P's Bill Schmidt: Style Makes the Sale

"DESIGN is the most important factor in selling today," says Bill Schmidt, the 35-year-old styling director and vice president of Studebaker-Packard Corp., South Bend, Ind.

"Of course, it's first necessary to have a well-made product and one which is competitively priced," he adds. After that, most of the sales appeal of any item rests in how it looks.

Appeal—Take two similar products, equally priced and equally well designed. One sells and the other doesn't. Styling appeal is the explanation. "Most people don't know exactly why they like a particular product. It just looks good to them," explains Mr. Schmidt.

He should know. Before heading up S-P's styling layout, Mr. Schmidt was in charge of advanced styling for the Lincoln-Mercury Division, Ford Motor Co. He styled the 1956 Lincoln whose sales this year jumped almost 30 per cent over 1955's. Other firsts include President Eisenhower's parade limousine, the X-500 and the Lincoln Futura, two of Ford's dream cars. Since 1955, he has had a finger in the styling plans of Studebakers and Packards. He's responsible for the sweeping tail fins on the 1957 Studebaker Hawk. "If you think that's good, wait until 1958," he confides.

Future—What's ahead in the styling field? "The trend definitely is to what we call sculptured steel. It means doing with basic sheet metal what usually is done with trim molding and paint.

"We're getting away from humps and bumps; aiming at smooth sweeping lines. The ultimate objective is to build a car so it looks like it is molded from a single piece of steel. It will have enough planes and surfaces to prevent it from resembling a box or cylinder."

Extracurricular — This is the theory Mr. Schmidt employs in his own company, Design Consultants, Detroit. He keeps a staff busy designing small industrial plants, motels and drive-in theaters. He also styles juke boxes, furniture and power hand tools. "It's all non-automotive business, so we have a real cross section of products to work with," he explains.

Mr. Schmidt started his styling career with Ford Motor Co. during World War II. By the time he was 22, he headed up a section which drew perspective sketches of war planes and defense materials for management people and engineers. "Lots of persons couldn't read blueprints, so our sketches showed them what the engineers wanted."

After the war, he rose quickly into advanced styling. When he switched to S-P, Mr. Schmidt separated styling from the engineering department and set up his own staff of some 80 people. They're busy working on future automobiles right now.

Check Small Accounts' Cost

They have some significance in your over-all sales picture if you understand their place thoroughly. If you don't, they can be a constant drain on your profits

A MANUFACTURER will not attempt to sell and service his biggest customer with his worst salesman, yet he has top salesmen calling on accounts which apparently have no potential. Are the practices incongruous?

There is no pat answer to the small account problem. No company can make all its sales at equal profit. Each must develop its own formula for dealing with the small account (see check list).

Discovery—Reynolds Metals Co. found that 10 per cent of its customers accounted for 80 per cent of its business after World War II. After adjusting for accounts that looked like potentially big customers, Reynolds' salesmen turned over many small accounts to distributors. One result: Reynolds' salesmen have time to go after customers who don't use aluminum, but who might be big users if properly developed.

About two years ago, a muffler manufacturer took a look at his sales costs and split off one channel of distribution into a subsidiary company.

A producer of electronic parts has recently instituted a policy of minimum orders and cut his customer list by 60 per cent.

Growing Trend—Those are examples of metalworking's increasing interest in cutting costs through better marketing methods. Basic to more sales at less expense: Finding the dividing line between profitable and unprofitable customers.

One manufacturer's rule of thumb: "The gross profit from an order should at least cover our variable expenses." Such costs include the salesman's expense of soliciting the business, freight costs, credit, collection and bookkeeping expenses. Depending upon your product, this rule can be applied to each order or to orders in any given period.

Sales Costs—The Sales Executives Club of New York reports the average cost of an industrial salesman's call is $17.24, with a range of $1 to $130. The average cost per order obtained may run from $44.89 to $187.39, again depending upon type of product, as well as the amount of research and engineering involved in servicing the customer.

It's axiomatic that a manufacturer wants salesmen to get bigger orders and make less calls to boost his gross profit as high as possible.

Small Accounts — Chances are that most of your unprofitable accounts will be the small ones. (You can't assume the infallibility of that idea, however; each of your accounts deserves analysis before you make a decision on its relative profit to you.) What is a small account? Like beauty, it depends solely upon the eye of the beholder.

You might strike an average sales volume per account over a year and call all accounts in the lower percentage brackets (you choose the bracket) small accounts. This technique will work if your business has big and small customers; it won't work if most of your customers buy about the same amount from you.

Ways and Means—The distributor (wholesaler or jobber, depending on your industry), is the logical man to handle small accounts. He's in business for that reason and can maintain closer contact with the users of your product than you can. In the end, a good distributor organization can mean money in the bank in terms of good will, plus less money-out-of-pocket in lost profits through small orders.

A Texas hardware jobber points a moral for all manufacturers: Even wholesalers can have too many small accounts. The wholesaler discovered that 55 per cent of his customers accounted for only 5 per cent of his sales, while 16 per cent gave him 74 per cent of his business.

Some small accounts were cut off; others were handed over to key retailers.

Moral Problem? — Some businessmen feel that a manufacturer is morally responsible to sell his products to all comers. There's also some prestige value in covering any market completely. If those two ideas appeal to you, you can approach the problem of small accounts from another angle: Build them up to the point where you can at least break even on an order.

The circus technique will work here. Instead of sending your salesman in territory X on 100 calls a month, cut him down to 30 on the biggest accounts, and send in a truck or trailer which displays your products to more than one buyer at a time.

A manufacturer of equipment for relining brakes and honing drums tried that with a great deal of success. The truck, staffed by a sales engineer who knew his product, pulled into a town with

half dozen brake shops and invited owners and mechanics to stop over. The brake clinics developed sales faster than the individual call could, and on-the-spot demonstrations were more efficient than the practice of having one salesman talk to one customer at a time.

If you wish, send out such a caravan on an annual basis, routing it over the nation. If you've analyzed your accounts correctly, you'll find the annual call can get the same results as 12 monthly calls by a salesman.

New Products—Here's a special problem: Your biggest customers for gadgets may not be willing to take a chance on your brand new widgit line. That's where the small account comes in handy; it's flexible enough to act as a testing ground for new products (especially if you're producing consumer goods).

So you can't afford to slice off 85 per cent of your customers, even though they give you only 7 per cent of your business; there's sometimes strength in numbers for special purposes. That also applies to a manufacturer getting into a position of being completely at the mercy of his biggest customer. It's nice to have at least one smaller account in reserve that you can build into a large account if you need to.

Production capacity should be considered, too. You'll get an increased cost of production per unit if you eliminate unprofitable customers without gaining bigger orders from your profitable customers.

Summing Up — In increasingly competitive times, it's less valid than ever to think of customers in terms of quantity rather than quality. The manufacturer who pushes his study of distribution costs (and acts upon its results) has another important handle on the net profit column.

Your salesman has the key to the small accounts problem. He's your scout in the front lines. Try to develop an easy-to-fill-out report which the salesman can turn in at least once a year. The most important information: Where will the account be five years from now? Do that and you'll know where your future battles have to be fought.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

How To Cut Distribution Costs On Small Accounts

Know your accounts

What percentage of your sales do small accounts constitute? How many small accounts do you service?

What types of businesses are you serving? Which are growth industries? Which may be slipping?

Which small accounts may become large accounts?

What is the average size of an order from your small accounts? From your large accounts?

What is the frequency of orders from small accounts? Is there a seasonal pattern?

Know your organization

How are your small accounts serviced? Directly? Through distributors? Other?

How much does it cost for your salesman to make a call?

How much does each order cost?

How do your clerical costs for small accounts stack up with costs for large accounts?

How much time does your salesman spend with each account? How frequently does he call on them?

How complete are your salesman's reports?

Upgrade a small account

Increase your quantity discounts

Charge an extra fee for credit on small orders

Charge a fee for orders below a minimum amount

Ship your product in a quantity which is common to most of your accounts

Put your salesman on a bonus plan

Offer fewer varieties of your product to small accounts

Cut off promotional assistance to small accounts

"Automate" your sales efforts

Use the telephone and mail rather than personal calls by salesmen

Make one call do the work of many: Try a caravan demonstrator

Boost your direct mail advertising budget

Try coupon-type advertisements in trade publications

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

The RIGHT ROLLER DESIGN and QUALITY CONTROL

The design and quality of the *rollers* play a large part in the performance of a cylindrical roller bearing. At right are some of the vital factors which must be considered.

All these factors are scrupulously controlled by the most modern precision equipment to insure maximum performance and life for every HYATT Roller Bearing. You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your requirements. Remember, HYATT is America's *first* and *foremost* maker of cylindrical roller bearings. Hyatt Bearings Division of General Motors, Harrison, New Jersey.

GM GENERAL MOTORS

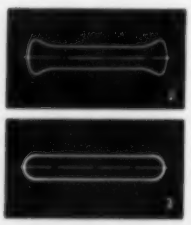
HYATT ROLLER BEARINGS

1. DISTRIBUTION OF LOAD WITHIN THE BEARING

Rollers are subjected to load only while in the "load zone," with maximum load while on the line of action of the bearing load, as shown in diagram 1. The theoretically perfect "load zone" extends from −90° to +90° from the line of action, but this is neither practical nor necessarily desirable. Under normal loadings, the actual "load zone" may range from 90° to 120°, depending on load and mounted internal clearance. This distributes the load so the load on the heaviest-loaded roller is approximately 5/N times the bearing load, where N is number of rollers.

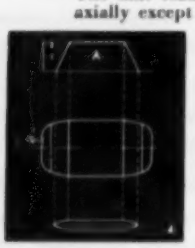
2. DISTRIBUTION OF LOAD WITHIN ROLLER'S AREA OF CONTACT

A cylinder deflects locally in the region of engagement when loaded between flat plates. The plate also deflects, so the original line of engagement is broadened into a "dog-boned" area under load, as shown in diagram 2. Moreover, deflected cylinders must gather in metal at their ends in *two planes, and this end-loading effect can seriously reduce the life of a cylindrical roller bearing.* All HYATT rollers have generous corner radii or blended chamfers to reduce end effect; and all HYATT Hy-Load rollers also have crowning to allow the contact area to "fade out" evenly (diagram 3).



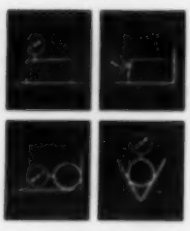
3. DISTRIBUTION OF LOAD ACROSS ROLLER

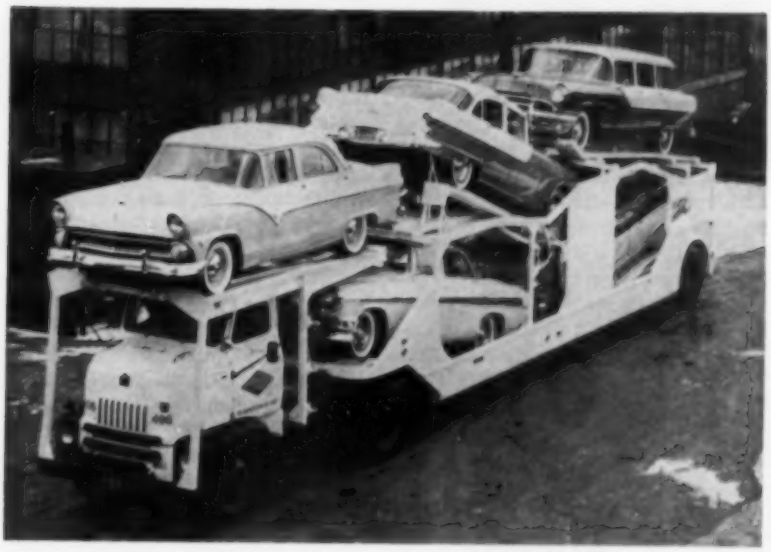
The unit load on any roller is uniformly distributed axially except at the crowned ends where it drops off to zero as shown in diagram 4. The summation of unit loads represented by area A is the total roller load. This same load under misalignment results in an area equal to area A; but maximum unit load is considerably greater and the bearing will have a shorter life than a properly aligned one. When the same total load is applied to an *uncrowned* roller, an even higher unit load results. This demonstrates the value of crowning when misalignment occurs.



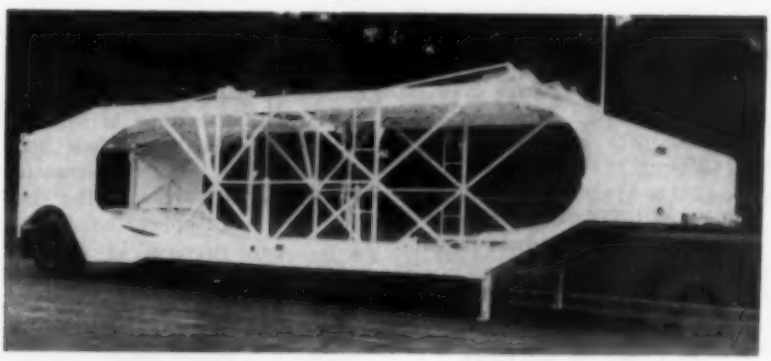
4. EFFECT OF ROLLER QUALITY ON BEARING PERFORMANCE

Lack of roller quality control has a very adverse effect on performance: 1. A roller with excessive *taper* tends to uneven load distribution and abnormal temperature rise. 2. A roller with excessive *end square* tends to noisy bearing performance. 3. A roller with excessive *two-point out-of-round* tends to poor segregation and poor bearing life. 4. A roller with excessive *three-point out-of-round* tends to noisy bearing operation. 5. A roller with *poor finish* tends to wear on all operating surfaces and noisy operation. 6. A bearing with excessive *roller-to-roller diameter variation* tends to poor bearing life. 7. A bearing with excessive *roller-to-roller length variation* tends to poor thrust capacity, abnormal temperature rise.





Fruehauf is replacing this five-car haulaway trailer because...



This model has same capacity but is 3000 lb lighter

Auto Haulaways Revised

LIGHTWEIGHT auto haulaway trailers will be rumbling across U.S. highways before long. They're being built in Fruehauf Trailer Co.'s Delphos, O., plant. Weighing about 7200 lb, the light rigs mean that annual tax savings of $100 to $300 on each trailer are possible.

The haulaway business is a stepbrother of the auto industry. More than two-thirds of the cars produced each year are transported to dealers on the highway carriers.

Sales—Mel Moss, sales manager for Fruehauf's haulaway products, estimates there are between 20,000 and 25,000 rigs on the road. The number varies, depending on how many cars are being produced each year. By 1960, he expects this figure will increase by at least one-third.

"Most sales are to the replacement market. That's about 2500 each year, although it looks like U.S. sales may hit 3000 units in 1957," says Mr. Moss. About 60 per cent of the sales are for four-car rigs. Uniform weight and size laws, expected to go into effect next month, should mean a rapid increase in the number of five-car haulaways.

Expansion — Fruehauf and its competitors are beginning to develop overseas markets. The demand for haulaways is starting to boom as companies like Ford, Chrysler, GM and Willys build production plants in foreign countries.

Africa, Australia and South America need haulaways. Foreign car manufacturers also look to American companies for carriers. The annual overseas replacement market is only about 1200 rigs now, but it shows signs of doubling or tripling in a few years. Each trailer costs between $4000 and $5000, excluding taxes and exporting costs.

Competition—There are seven or eight major haulaway manufacturers in the country. Another 50 or more shops fabricate carriers on a piecemeal basis. Like most heavy highway transports, their taxable weight is a constant problem. Fruehauf hopes its tubular aircraft design will lick this.

"Haulaways always have been built with a separate frame and body, much like automobiles," explains Mr. Moss. Frames were formed from ¼-in. cold-rolled steel. If a rig wasn't strong enough, the builder usually welded on another piece of steel. All this added up to 10,000 or 12,000-lb trailers and costly construction methods.

Unconventional — Reports Mr. Moss: "We'd been trying to cut down weight ever since we re-entered the haulaway business in 1952. We finally decided to scrap all conventional methods and shoot for something completely new."

Paul Erickson, project engineer, and George Bodnar, assistant project engineer, came up with a tubular truss design which combines frame and body into a unitized structure. Jig and fixture assembly methods cut fabricating time in half.

"We use SAE 950 steel in our truss structure. It's lighter and the tubular design makes a strong-

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er trailer," says Mr. Bodnar. The design can be adapted to any of Fruehauf's five lines of auto carriers.

Simple — Production has been simplified. All parts for the sides and bottom of the trailer are placed in fixtures and positioned in a huge master jig for fastening and welding. Even the aluminum tracks, which have been preassembled, are included.

Side panels, decks and tracks of aluminum weigh about 1000 lb, reports Mr. Bodnar. Axle assemblies run around 3000 lb. Another 3000 lb of steel goes into truss and frame members. Fruehauf is considering switching back to a lighter gage steel for tracks. It may cut down weight even more. Mr. Moss hints that a 6000-lb trailer isn't impossible, but admits the company isn't about to build one.

Adaptable — Since haulaways have to transport old cars as well as the new lower models, body crossmembers and tracks can be raised or lowered to accommodate different car heights. This involves rewelding and bolting.

Two tie-down chains and ratchets on each side of a trailer hold down all the cars. Mr. Bodnar explains that older haulaways have eight separate ratchets for different types and models.

Competitors charge Fruehauf's design is flimsy and won't stand up over long hauls. Mr. Moss cites a series of strain and impact tests which prove truss design is stronger than frame-body construction. He adds that the trailer will completely pay for itself in five years.

Truckbuilders Slapped

One brave man has told the truck industry it's sacrificing simple maintenance for styling.

A. Walter Neumann, director of purchases and maintenance, the Willett Co., Chicago, feels maintenance costs are a large part of truck fleet operational costs. "It would seem that designing trucks for easy maintenance certainly is worthy of more consideration," says Mr. Neumann.

He spoke before the Society of Automotive Engineers at its National Transportation Meeting, Oct. 10-12, New York. His speech: "Design and Its Effect on the Maintenance of Trucks and Tractors."

"Ugly or strange looking vehicles definitely are not advocated," says Mr. Neumann, who thinks truckbuilders are too style conscious. "Bulging cabs, overgenerous fenders, projecting grilles and set-back bumpers are not essential and in fact, contribute toward poor visibility and higher maintenance costs."

Here are some examples: "To remove and replace the power steering pump belt on some trucks, it's first necessary to remove the lower radiator hose (which means draining the radiator). This is especially troublesome when antifreeze is used."

One light delivery truck has such a streamlined body that its body and its axle have to be jacked up to make a simple tire change, he reports.

"The exhaust tail pipe on a certain make of tractor points toward the left rear wheel. Moisture laden exhaust fumes hit the brake mechanism and sometimes cause it to freeze up," adds Mr. Neumann.

Biggest jabs are reserved for cab-over-engine trucks. It takes 45 minutes longer to adjust tappets on a COE model, compared with a conventional truck. Replacing spark plugs takes an extra man-hour. So does the replacement of a distributor. Changing an engine in a conventional truck takes 16 man-hours. On a cab-over-engine type, it takes 31.5 man-hours.

Mr. Neumann admits that truckbuilders are responsible for development of many new features. He still feels that in some cases maintenance simplicity has been overlooked.

U.S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804	659,763
August	401,996	614,493
September	190,709†	461,591
9 Mo. Total	4,233,996†	5,993,001
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
Sept. 8	47,771	79,366
Sept. 15	64,350	122,263
Sept. 22	35,652	123,109
Sept. 29	43,369	115,723
Oct. 6	55,627†	80,271
Oct. 13	68,000*	101,581

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Exhaust Notes

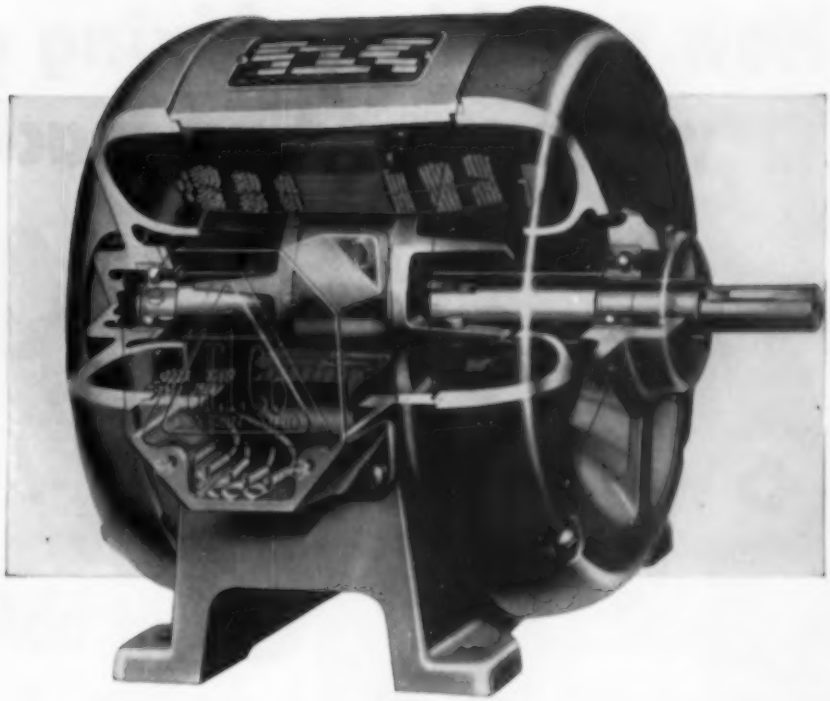
• Anodized aluminum trim will continue to gain in popularity as long as nickel remains in short supply, says C. F. Nixon, head of Electrochemistry department of General Motors Corp.'s research staff. He points out the GMC Truck & Coach Division has used aluminum trim for 25 years.

• Conflicting reports are circulating about a triple turbine Dynaflow transmission for Buick division. One rumor has it that tooling is delaying the program. Another comment: Some $75 million worth of tooling is finished, but the transmission has been shelved for competitive reasons. What ever the reason, the unit probably won't appear until 1958.

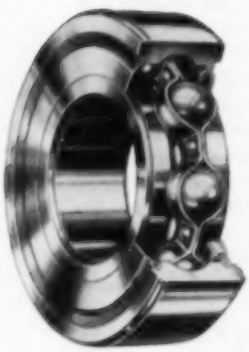
• De Soto Division of Chrysler Corp. reports its accessory sales have picked up 15 per cent this year over 1955's, although new car sales are down by almost the same amount. Biggest gains came in power steering (up 12.3 per cent), color sweep (up 30 per cent) and dual exhausts (up 46.4 per cent).

• American Motors Corp.'s Roy Abernethy, vice president of distribution and marketing, predicts the industry will make and sell 20 million automobiles by 1960. He puts 1957 sales between 6.5 million and 6.7 million.

• A 1936 Ford which looks like it just came off the assembly line was featured at Allegheny Ludlum Steel Corp.'s booth at the Metal Show. It's an all-stainless steel bodied car, one of six built years ago to show durability of stainless. When Allegheny reacquired the car, it needed repairs and replacement of working parts, having been driven more than 250,000 miles. But the stainless exterior was in excellent shape.



BALL BEARINGS CUT LUBRICATION MAINTENANCE TO VIRTUALLY ZERO



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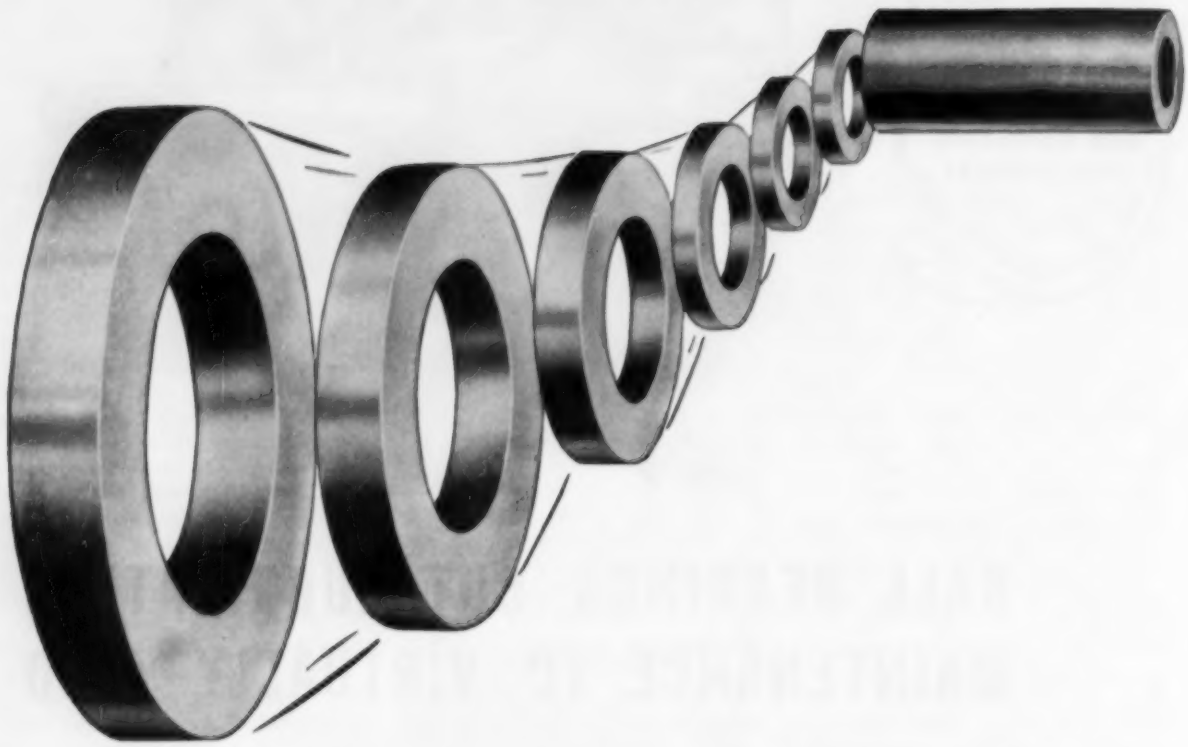
NOTHING ROLLS LIKE A BALL

How to add machining capacity without adding machines



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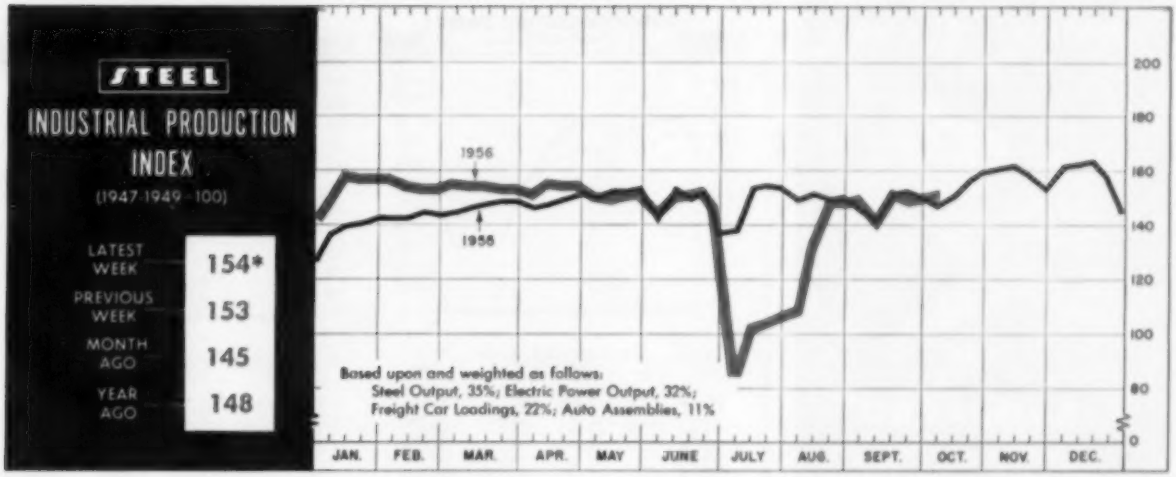

*Week ended Oct. 6.

Appliances Add to Fourth Quarter Strength

MAKERS of major appliances are expecting to contribute their full share to metalworking's biggest quarter, and they are confident of reaping full benefits. Many lines will establish annual sales records on the basis of a strong fourth quarter finish.

While not expecting a flurry of Christmas sales like that of their kissing cousins, the manufacturers of small appliances (STEEL, Oct. 8, p. 72), the big appliance people expect at least a moderate pre-Christmas increase to help carry them over the top. It will be a continuation of the improvement that began in August, fortified by the fact that several appliances, such as clothes dryers, are entering their best selling seasons (see chart, page 88).

Ratio—Sales will outrun production because inventories of most appliances are heavier now than they were at the same time last year. That's because of the unexpected slump in spring and early summer. Stocking up on new models also has contributed to this condition. One laundry equipment manufacturer says the inventory-sales ratio is about 2 to 1—what he describes as a "danger point." He feels that a reduction in this ratio is prudent, even if production has to be held in check. This may help explain why the industry is not expecting any material shortages during the fourth quarter when auto producers jump head first into the steel market.

Tight money and credit won't keep the industry from achieving its goals, most industry spokesmen believe. "I feel that many people have been saving for a rainy day this year. While credit buying will remain the chief method of obtaining appliances, many consumers are going to be in a better position to pay cash this fall," declares the president of a midwest appliance company.

Higher Price Tag—Regardless of how purchases are made, new appliances will cost more before the quarter is past. The new prices announced by most manu-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,511[1]	2,506	2,330
Electric Power Distributed (million kw-hr)	11,400[1]	11,365	10,639
Bituminous Coal Output (1000 tons)	10,455[1]	10,150	9,567
Petroleum Production (daily avg—1000 bbl)	7,025[1]	7,044	6,690
Construction Volume (*ENR*—millions)	$490.0	$483.4	$464.6
Auto, Truck Output, U. S., Canada (*Ward's*)	81,774[1]	59,092	102,196
TRADE			
Freight Car Loadings (1000 cars)	825[1]	831	807
Business Failures (Dun & Bradstreet)	251	262	186
Currency in Circulation (millions)[3]	$30,767	$30,714	$30,428
Dept. Store Sales (changes from year ago)[3]	+3%	+8%	+15%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,951	$23,174	$22,196
Federal Gross Debt (billions)	$274.2	$274.4	$277.5
Bond Volume, NYSE (millions)	$19.8	$18.3	$21.0
Stocks Sales, NYSE (thousands of shares)	10,384	9,788	10,513
Loans and Investments (billions)[4]	$85.7	$85.8	$84.5
U. S. Govt. Obligations Held (billions)[4]	$26.1	$26.4	$30.3
PRICES			
STEEL's Finished Steel Price Index[5]	225.71	225.71	208.97
STEEL's Nonferrous Metal Price Index[6]	264.8	264.3	264.0
All Commodities[7]	115.0	115.2	111.4
Commodities Other Than Farm & Foods[7]	122.6	122.6	118.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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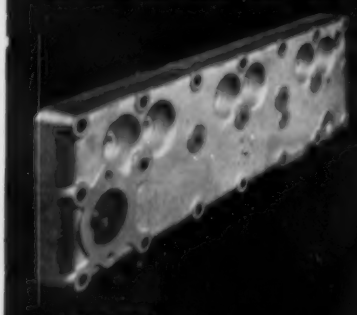

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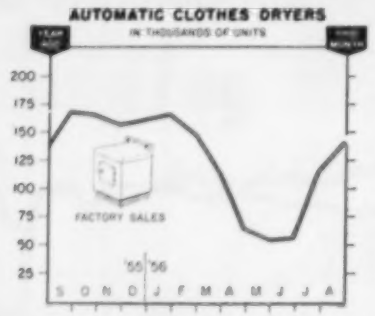
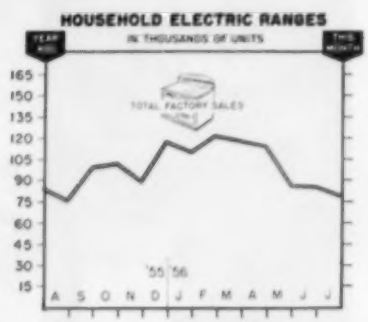
THE BUSINESS TREND



Factory Sales—Units	1956	1955	1954
Jan.	166,243	115,383	82,195
Feb.	148,522	109,215	62,488
Mar.	113,031	113,498	51,796
Apr.	64,923	73,978	37,661
May	55,330	49,228	26,533
June	58,441	70,616	30,297
July	117,548	60,516	40,755
Aug.	144,537	136,190	80,165
Sept.	.....	169,905	107,084
Oct.	.....	166,889	122,182
Nov.	.....	157,153	138,254
Dec.	.....	161,823	115,341
Totals	.....	1,384,394	897,751

American Home Laundry Mfrs. Assn.
Charts copyright, 1956, STEEL.



Total Factory Sales—Units	1956	1955	1954
Jan.	110,140	136,663	101,870
Feb.	122,514	127,185	109,847
Mar.	117,544	130,180	115,393
Apr.	114,619	108,619	92,751
May	85,977	109,283	82,649
June	84,562	105,088	85,854
July	79,766	85,829	88,017
Aug.	.....	76,158	78,997
Sept.	.....	101,100	99,611
Oct.	.....	103,610	84,321
Nov.	.....	88,290	79,340
Dec.	.....	118,161	85,033
Totals	.....	1,289,949	1,092,393

National Electrical Mfrs. Assn.

facturers have not reached the consumer level because of the large inventory carried at the old prices. One range maker says his sales have picked up abruptly since his company announced increases in mid-September. "It's not only the rush to get the cheaper model," he says, "but also the feeling that if prices went up once, they may do it again. When we reduce prices, there is a lull in buying. Generally speaking, ranges are behind last year's pace (see chart above), but on the basis of the past month, we expect an upswing this quarter."

Even for refrigerators, which are normally downtrending at this season, the market is firm. It has been that way since August, and right now it is better than it was at this time last year. The drop in housing starts has cut into a good market, but refrigerator makers are optimistic about the long-term demand because of the growing importance of the replacement market.

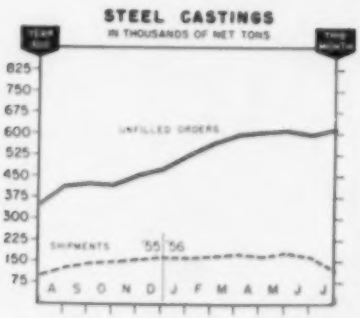
Records Galore—The most record-conscious segment of the appliance industry is household vacuum cleaners—for the 25th straight month, it has posted a record. The 276,932 factory sales marked up in August brought the eight-month total to 2,448,188 cleaners, the highest for the period in the history of the industry and 18.6 per cent ahead of year-ago.

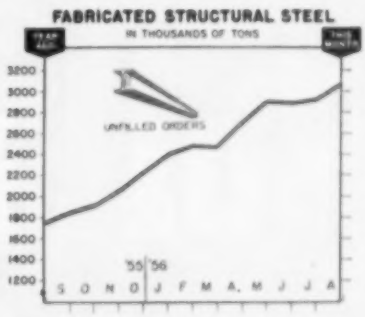
Castings: Good as '55

With demand on the uptrend—especially from their No. 1 customer, the railroads—steel founders aren't likely to make much of a dent in the huge backlog of orders piled up through July (see chart, page 89). "Despite the impact of the steel strike and vacations, this year will equal last year in dollar volume and at least pull even on a tonnage basis," says an industry official. Demand for steel castings from car builders will be limited only by their ability to get structural and plate steel. With an already unwieldy backlog of 122,870 cars, signs are pointing to increased order activity from the roads. The Chesapeake & Ohio ordered 2000 hopper cars at about the same time Seaboard Air Line Railroad announced plans to purchase 2400 this month.

Structural Demand Grows

Competition for heavy steel products mounts as structural





	Shipments		Unfilled Orders*	
	1956	1955	1956	1955
Jan.	158.7	98.2	519.4	201.8
Feb.	165.4	106.4	567.3	202.3
Mar.	170.0	127.5	595.0	215.1
Apr.	163.7	120.1	600.2	221.3
May	178.2	122.5	608.3	225.3
June	164.7	133.9	597.1	251.4
July	118.0	97.8	611.2	354.6
Aug.	....	126.4	....	413.5
Sept.	....	140.8	....	420.6
Oct.	....	145.7	....	418.1
Nov.	....	152.4	....	453.1
Dec.	....	159.0	....	475.3
Total	....	1,530.7		

*For sale. U.S. Bureau of the Census

	Shipments		Backlogs	
	1956	1955	1956	1955
Jan.	251.5	225.8	2,408	1,346
Feb.	285.4	213.4	2,476	1,360
Mar.	306.8	227.8	2,463	1,392
Apr.	289.6	239.7	2,687	1,444
May	306.2	223.2	2,896	1,592
June	284.7	282.3	2,859	1,706
July	165.5	219.4	2,904	1,639
Aug.	213.5	268.0	3,076	1,776
Sept.	....	289.1	....	1,854
Oct.	....	283.8	....	1,928
Nov.	....	258.9	....	2,075
Dec.	....	248.0	....	2,243
Total	....	2,979.4		

American Institute of Steel Construction.

steel fabricators continue their recovery from the steel strike. The American Institute of Steel Construction reports that backlogs passed the 3-million-ton mark in August (see chart above). Bookings for the first eight months of this year are 17 per cent ahead of those in the corresponding period of 1955, while shipments are only 11 per cent ahead.

Building Posts Records

Paced by industrial building, construction exceeded $4.2 billion in September, say Commerce and Labor departments. This raised the third-quarter total to about $12.8 billion, 3 per cent above the third quarter last year. For the first time in any quarter, private industrial construction rose above the $800-million mark. Office and church building and public construction also advanced to records for September. The annual rate of all construction remains at $44.5 billion, compared with an outlay of $43 billion in 1955.

Housing starts are still the big weakness in construction, and they will be weaker next year if tight money conditions continue, says a national group of builders. It told government officials that housing starts will drop to 800,000 next year unless the government eases mortgage credit.

Employment Still High

Employment figures still reflect the high level of the economy even though they declined in September, reports the Commerce department. Nearly 66.1 million persons were working, a record for the month by about 1.3 million. The decline from the August all-time record figure of 66,752,000 was accounted for by the withdrawal of students from the labor market. Unemployment continued on a downtrend, dropping to just under 2 million as school opened.

Consumer Credit To Rise

Introduction of new models by the auto makers will be felt in more places than the production lines. One of the most important will be the rise in consumer credit. Through August, total installment credit stood at the high of $29.4 billion, up $325 million from July and $3.3 billion from August, 1955. Auto paper, at $15.4 billion, accounts for over half the total debt.

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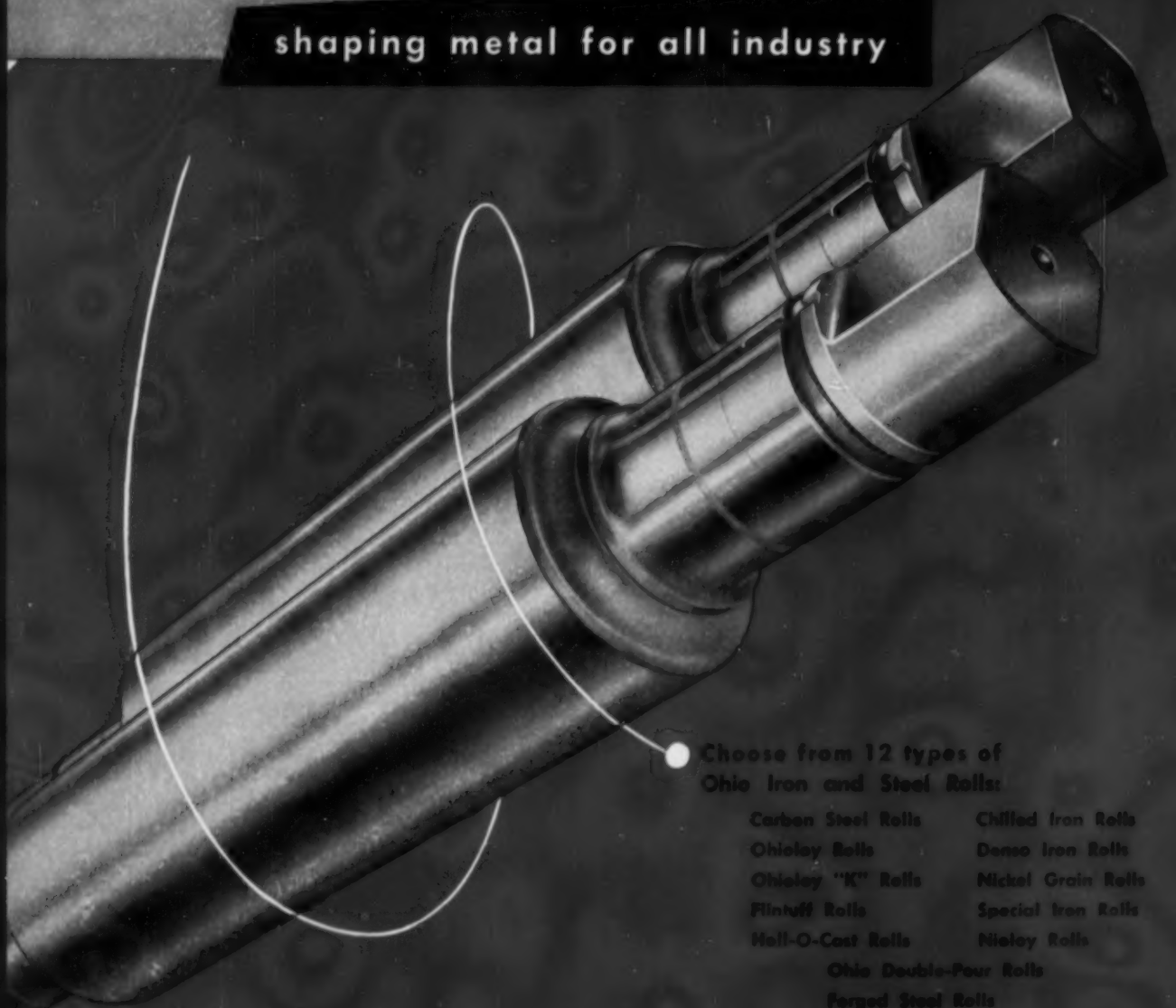
Ohio Rolls

shaping metal for all industry



Choose from 12 types of
Ohio Iron and Steel Rolls:

- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Hall-O-Cast Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls
- Ohio Double-Pour Rolls
- Forged Steel Rolls

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO

Plants at Lima and Springfield, Ohio

ROLAND J. AHERN
. . . heads Peck, Stow & Wilcox

RICHARD L. LINDLAND
. . . heads Campbell, Wyant & Cannon

ERNEST G. UNRATH
. . . National Supply v. p.-manufacturing

Roland J. Ahern was elected president and general manager, **Peck, Stow & Wilcox Co.**, Southington, Conn. He continues to serve as chairman. He is president and general manager of the parent firm, Billings & Spencer Co., Hartford, Conn., and continues in that capacity.

G. E. McCulloch was elected president, **Metal Spinners Inc.**, Milwaukee. His predecessor, **Jack V. Allan**, asked to be relieved of his duties for reasons of health. Mr. Allan was named vice president.

Hoffman Iron & Steel Co., Vienna, O., named **Glenn C. Offhut** vice president-sales; **Louis S. Hoffman**, superintendent-production.

Merlin H. Birk was elected administrative vice president, **Consolidated Foundries & Mfg. Corp.**, Chicago. He was with Waukesha Foundry Co.

R. W. Frederick was made assistant sales manager, mill products, **Bridgeport Brass Co.**, Bridgeport, Conn. He is succeeded as Milwaukee district manager by **Arnold W. Hansen.**

John D. Rhule was appointed staff engineer, **Automatic Control Division**, Teller Co., Butler, Pa. He was with the atomic energy division of Westinghouse Electric Corp.

Richard L. Lindland was elected president, **Campbell, Wyant & Cannon Foundry Co.**, Muskegon, Mich., a division of Textron Inc. He succeeds **Carl E. Allen**, who resigned to become president of the Federal Reserve Bank of Chicago.

Warner B. Bishop Jr. succeeds **L. P. Robinson**, retired, as vice president, foundry products division, **Archer-Daniels-Midland Co.**, at Cleveland.

C. R. Horton was named chief marine engineer of **Dravo Corp.'s** engineering works division, Pittsburgh. He succeeds **Albert J. Dawson**, retired. Mr. Horton was assistant director, research and development.

Donald M. Berges was elected a vice president of **Jack & Heintz Inc.**, Cleveland, responsible for activities relating to commercial motors and the development of new product lines and markets. He was a vice president, Master Electric Co.

Carl C. Clabaugh was made manager, metal cleaner department, **Cowles Chemical Co.**, Cleveland.

Lewis T. Gibbs was made manager and **Stanley C. Lore** assistant manager of **United States Steel Corp.'s high strength steel sales division.** Pittsburgh. Mr. Gibbs succeeds **M. B. Sunderland**, retired.

F. W. Bremmer was elected vice president - engineering, **National Supply Co.**, Pittsburgh. Formerly vice president-manufacturing, he is succeeded by **Ernest G. Unrath**, works manager of the Ambridge, Pa., seamless pipe mill. **Joseph R. Mahan**, director of engineering, was made director of research and engineering (established as a separate function of the company) and reports directly to the president.

William R. Bascom was elected a vice president, **Granite City Steel Co.**, Granite City, Ill.

Jerome D. Katz joined **M. Cohen & Son Co.**, Cleveland. He was with Jacob A. Katz & Sons Inc.

William H. Miller was named vice president-manufacturing, **Cook Electric Co.**, Chicago. Chicago plant manager for the last year, he previously was with Houdaille-Hershey Corp.

Leo A. Merryman was elected president, **Tonawanda, N. Y., Iron Division**, American Radiator & Standard Sanitary Corp. He succeeds **Charles R. Holzworth**, retired.

George A. Kaufman was named to the new post of assistant chief engineer-engineering and planning, **Jones & Laughlin Steel Corp.**, Pittsburgh. He was chief electrical engineer.

G. B. Edgell was made manager,

R. S. GRUVER

L. H. JUENGLING

. . . head Armco steelmaking operations

engineering department, **Davey Compressor Co.**, Kent, O.

William C. Mullin was named sales manager for instrument gages of the gage division, **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He succeeds **Albert S. Burgoyne** who leaves the company Nov. 1.

Thomas A. Carr was made supervisor of metallurgy and quality control, spring division, **Crucible Steel Co. of America**, Pittsburgh.

Albert S. Burgoyne fills the new post of vice president-manufacturing, **E. W. Bliss Co.**, Canton, O. He was with the gage division of Pratt & Whitney Co. Inc. He joins Bliss Nov. 1.

Henry C. Thorpe was named district sales manager and **George C. Montor**, sales engineer in the New York area for **Metals Processing Division**, Curtiss-Wright Corp.

Ira J. Kaar was named vice president and engineering director, **Hoffman Electronics Corp.**, Los Angeles.

Gene R. Voigt was made sales manager, air tool division, **Aro Equipment Corp.**, Bryan, O. He was assistant to the division general manager.

Armco Steel Corp., Middletown, O., announces that its steelmaking operations are now under two separate divisions: **R. S. Gruver**, administrative vice president, heads the Armco Division; **L. H. Juengling**, the Sheffield Division. Mr. Juengling was elected vice president to succeed **J. W. Anderson**, retired. Distribution of company products will be directed by **L. T. Johnston**, vice president - distribution. **W. S. Newell** was made general sales manager-Sheffield Division; **W. B. Quail** continues as general sales manager-Armco Division. Vice President **F. H. Fanning** heads a new division for planning and development. **C. G. Davies**, administrative assistant in the Armco Division, was made assistant vice president. **L. F. Reinartz**, vice president-special operating development, has retired. **F. C. Herbster**, manager of the Kansas City, Mo., plant, has also retired and is succeeded by **R. F. Kuhnlein**.

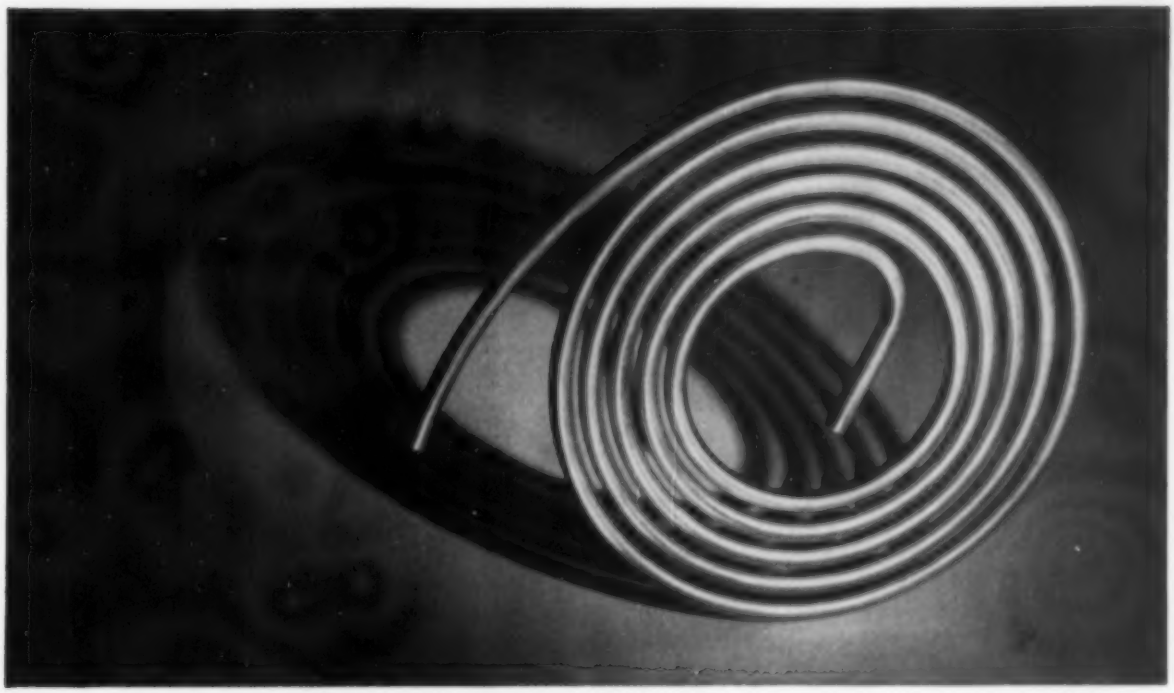
Donald R. Church was named chief engineer, **Acoustica Associates Inc.**, Glenwood Landing, N. Y. **Morris Kenny** was made project engineer for the firm's Air Force missile systems development program. **Martin A. Damast** was appointed senior electronic engineer.

Charles G. Chisholm was made general sales manager, **Haynes Stellite Co.**, a division of Union Carbide & Carbon Corp., New York. He has been sales development manager for investment cast-

ALBERT S. BURGOYNE
. . . Bliss vice president-manufacturing

GENE R. VOIGT
. . . sales mgr. for Aro air tools

CHARLES G. CHISHOLM
. . . Haynes Stellite gen. sales mgr.



Superior offers the widest range of sizes and alloys in top quality instrument tubing

Superior Tube Company produces the finest instrument tubing in a wide range of sizes and alloys—offers you as standard products what many makers would classify as specialty tubing.

1. NEEDLE TUBING

The stainless steel links in this recording instrument are made of Superior needle tubing. The high strength, stiffness, and strict dimensional tolerances characterizing this tubing—originally designed for surgical uses—have opened new fields of industrial applications when used as mechanical tubing.

2. PRESSURE AND SUPER PRESSURE TUBING

A spiral windpipe made of Superior 304 cold-drawn seamless stainless steel tubing. Pressure tubes are used to convey fluids at elevated temperatures and pressures. Produced in stainless, carbon and alloy steels in sizes to withstand pressures up to 100,000 psi.

3. BOURDON TUBING

A "C" tube element for a pressure gage. The shaped Bourdon tube serves as the actuating element for the majority of pressure indicating and recording instruments. Helix and spiral elements are also fabricated from the wide range of alloys available at Superior—a range that makes it possible to satisfy any set of conditions in the use of Bourdon tubing.

4. CAPILLARY TUBING

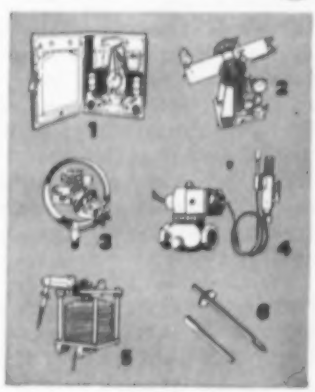
A thermostatic instrument pressure transmission element with a coiled unit made of Superior Type 321, capillary tubing. Superior capillary tubing is used primarily for transmitting temperature and pressure impulses from the source to a recording or indicating instrument. Capillary purposes, in general, require a heavy-wall tube with an ID of .006" to .030". Types 347, 321, 316, MONEL* and carbon steels are recommended analyses.

5. LARGE OD LIGHT WALL TUBING

A large OD light wall tubing bellows in a pressure actuating element. Present applications for large OD light wall tubing include bellows, low pressure heat exchanger tubes, flexible hose, aircraft ducting, fractional horsepower motor casings, ceramic drills, and casings for radioactive well logging instruments. Sizes offered up to 2½" OD.

6. MECHANICAL TUBING—INSTRUMENT LINE

Various fabricated parts—all made of Superior mechanical tubing. Superior mechanical tubing can be either seamless or WELDRAWN† grade used statically or dynamically, but not subjected to severe temperature or pressure. It is produced in sizes up to ⅝" OD within production limits, in many special shapes, and in over 63 standard analyses and mechanical properties.



Send for free copy of Bulletin 40—A Guide to the Selection and Application of Superior Tubing. Write Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010" to ⅝" OD—certain analyses in light walls up to 2½" OD

On the West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif.

*Reg. T.M. International Nickel Co.
†Reg. T.M. Superior Tube Co.

MORD LEWIS
. . . Anaconda Aluminum vice president

FRANK E. WHYTE
. . . directs purchases at Pantex Mfg.

WALTER J. KALMEYER
. . . Standard Steel vice president

ings and high-temperature and corrosion-resistant alloys.

Mord Lewis was elected vice president of **Anaconda Aluminum Co.**, subsidiary, Anaconda Co., New York.

L. C. Cairns was made purchasing agent, **Herman Pneumatic Machine Co.**, Pittsburgh.

Pittsburgh Tube Co., Pittsburgh, elected: **Jonathan W. Freeman**, chairman; **William K. Hahn Jr.**, president; **Harold K. Brooks**, senior vice president-secretary; **R. W. B. Hannan**, vice president-sales; **H. M. Feely Jr.**, vice president-operations; **E. Rodney Hornbake**, sales manager; **William C. Kyle**, treasurer.

Welling W. Adams was made western regional sales manager, **Rigidized Metals Corp.** He will have an office in Los Angeles.

Frank E. Whyte was made director of purchases, **Pantex Mfg. Corp.**, Pawtucket, R. I. He formerly was manager of purchasing for Carborundum Co.

Milton C. Morrison was named product sales manager for roll-formed shapes, industrial parts division, **Reynolds Metals Co.**, Louisville.

Leonard M. Ansley was made plant manager at Cleveland for **Inland Steel Container Co.** He was director of purchasing for Inland's five plants.

Norman R. Thal Jr. joined **Inshield Die & Stamping Co.**, Toledo, O., as assistant to **Ralph B. Divins**, vice president-general superintendent.

Lyle B. Hoskins was made plant manager of the new Parkersburg, W. Va., operation of **Carborundum Co.**

Walter J. Kalmeyer was elected vice president, **Standard Steel Corp.**, Los Angeles. He continues as production manager. **Clay C. Hopper** was made assistant general manager; **Norman Pitt**, chief engineer.

William R. McCalister was made general superintendent of **National Tube Division's** Ellwood City, Pa., Works, U.S. Steel Corp. He succeeds **H. W. Hudson**, retired.

William J. Taylor was elected vice president-sales, **Chromium Mining & Smelting Corp.** and subsidiaries. He has headquarters in Pittsburgh. He was formerly with Pittsburgh Metallurgical Co.

Dr. W. H. Schechter was elected vice president - operations, **Callery Chemical Co.**, Callery, Pa. He was associate director-research for Callery, a subsidiary of Mine Safety Appliances Co.

OBITUARIES . . .

Frank A. Michell, 67, chairman, **SAE Steels Inc.**, Cleveland. died Sept. 30.

Hayden P. Marsh, head of **H. P. Marsh Co.**, Binghamton, N. Y., died Sept. 25.

Robert B. Pogue, 67, consulting engineer and former vice president-engineering, **Brake Shoe & Castings Division**, American Brake Shoe Co., died Sept. 26 in Orange, N. J.

William B. Coleman, 68, metallurgist and former president of **American Society for Metals**, died Sept. 30 in Atlantic City, N. J.

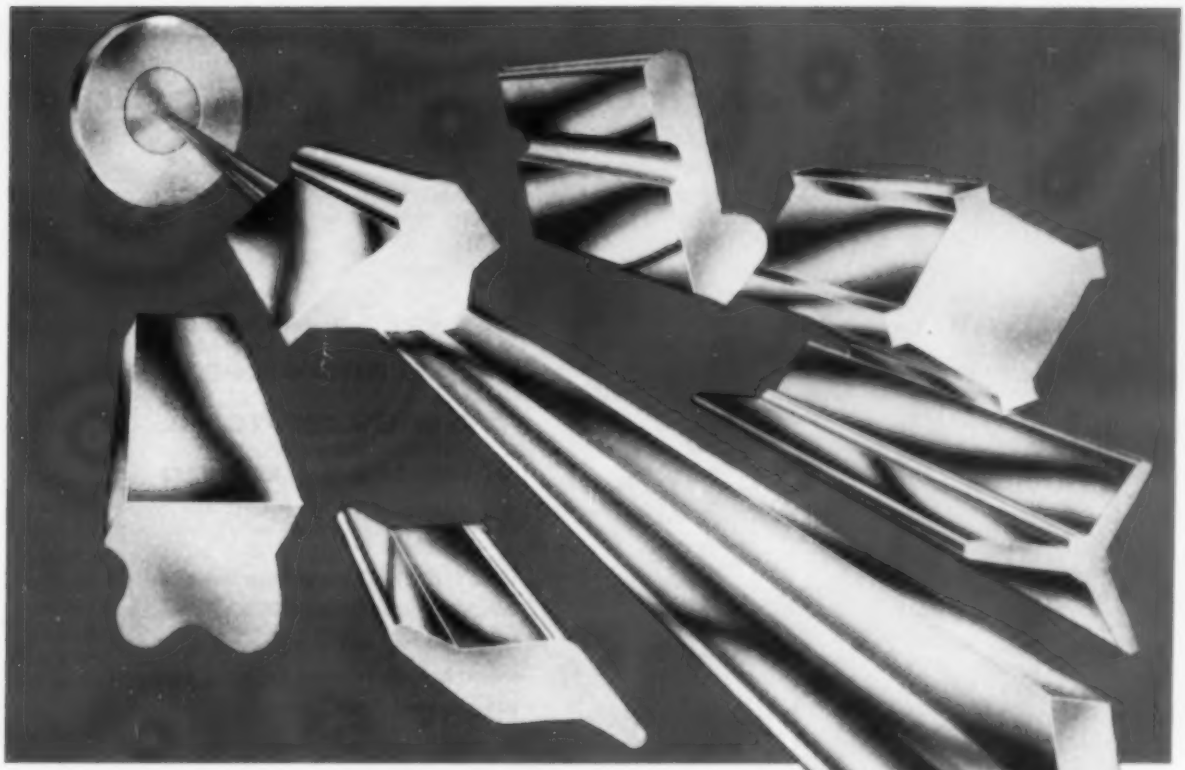
E. L. Essley, 89, president-treasurer, **E. L. Essley Machinery Co.**, Chicago, died Oct. 1.

Irving H. Tolles, 73, former vice president, **Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn., died Sept. 22.

William J. Brennan Sr., 76, president, **Geneva Foundry Corp.**, Geneva, N. Y., died Sept. 22.

James McNamara, 57, regional sales manager for **Borg-Warner Corp.**, died Sept. 25 in Erie, Pa.

Nathan Ransohoff, founder and chairman, **Ransohoff Inc.**, Cincinnati, died Sept. 24.



J&L custom-made hot extruded cold drawn sections... boost production, cut over-all costs

Progressive industry is today utilizing J&L's Custom-Made, Hot Extruded Cold Drawn Steel Sections to:

1. **Eliminate time and costs** in machining and finishing operations
2. **Reduce scrap losses** practically to the zero point
3. **Eliminate the cost of castings and forgings** of intricate sections requiring considerable machining
4. **Reduce inventories** due to quick availability of extruded sections from the J&L plant

These sections can be extruded and cold drawn to the exact specifications of the parts you require — in any quantity you specify. Even the production of a single extrusion can be economical. Obtainable in a wide range of material grades, J&L Extruded Sections can be produced in a large variety of shape profiles — within limits of a design which can be inscribed within a two-inch circle. Many shapes that cannot be hot rolled are practical for the extrusion process.

The mechanical properties of J&L Extruded Sections are equal to or superior to those obtainable from equivalent grades conventionally cold drawn. Cold drawn tolerances are accurately maintained. The excellent surfaces of these Extruded Sections require little — if any — finishing operations.

Send us your inquiry for prompt and efficient J&L service.

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Write today for your copy of this free new booklet which gives detailed information about the many money- and time-saving advantages J&L Extruded Sections offer you.

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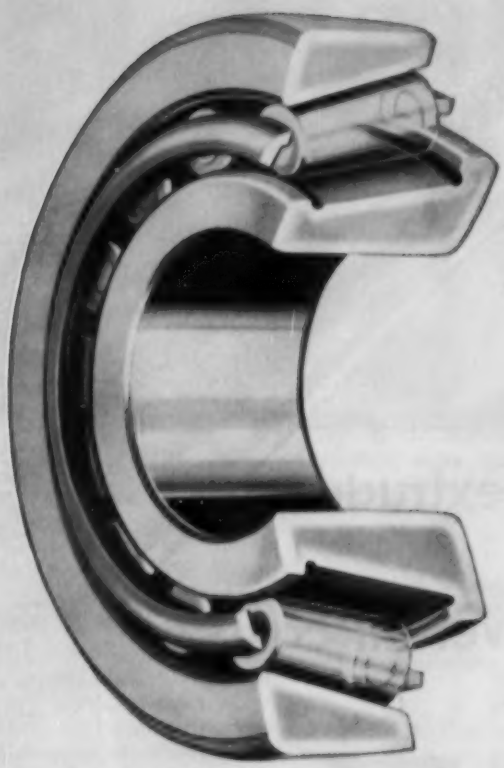
There's a BOWER TAPERED ROLLER BEARING engineered to fit your product



Types and sizes to fit a wide range of tapered bearing applications

There's no need to compromise with bearings! Whatever your product, if it uses tapered roller bearings, call in a Bower engineer for expert help on selecting the exact type and size you need.

Depending on your own particular needs, he'll make sure you get the exact size and type—selected from Bower's complete tapered line—engineered to assure maximum performance in your application.

Most important of all, when you specify Bower tapered roller bearings for your product, you get all the advantages of advanced Spher-O-Honed design—less maintenance, longer life, smoother operation. Get the full facts on the *complete* Bower line.

Tapered, Straight and Journal Roller Bearings for every field of transportation and industry

BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION • FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICH.

Plans Expansion

Diamond Alkali will spend up to $80 million in five years to boost production facilities

DIAMOND ALKALI CO., Cleveland, plans to carry out a $60 million to $80 million capital expenditure program during the next five years (1956 through 1960). It has been set up on the assumption of "a continued healthy business climate and more or less uniform price level" in that period.

Texas Plant—The major investment will be at the company's Deer Park plant at Houston. Caustic soda production will be expanded, and "chlorine capacity will be increased by some 20 tons a day—about a 40 per cent gain," says John A. Sargent, president.

Engineering is already well along, and all the major items of equipment have been ordered. The unit is scheduled to come on stream in early 1958.

Of equal importance to the firm's long-term future, but not involving as much capital, is a projected acetylene plant (based on natural gas) to be built at Deer Park.

Diamond also is doubling the capacity of its perchlorethylene and polyvinyl chloride resin plants at Houston. These expansions will come on stream during the first half of 1957.

Ohio Project—The other major expenditures are at Painesville, O., where Diamond is adding about 1 million barrels per year to its cement capacity, bringing the total to 3 million barrels. This project should be in full operation by late spring, 1957.

A major modernization program is proceeding at Diamond's Soda Products Division. By 1960, it'll be able to put about 30 per cent more soda ash on the market than it does now.

Brandes To Build Plant

Brandes Press Co., Cleveland, will build a plant in Lake City, Pa., for the production of automatic metal stamping presses, lathes and other products.

Enters Crane, Conveyor Field

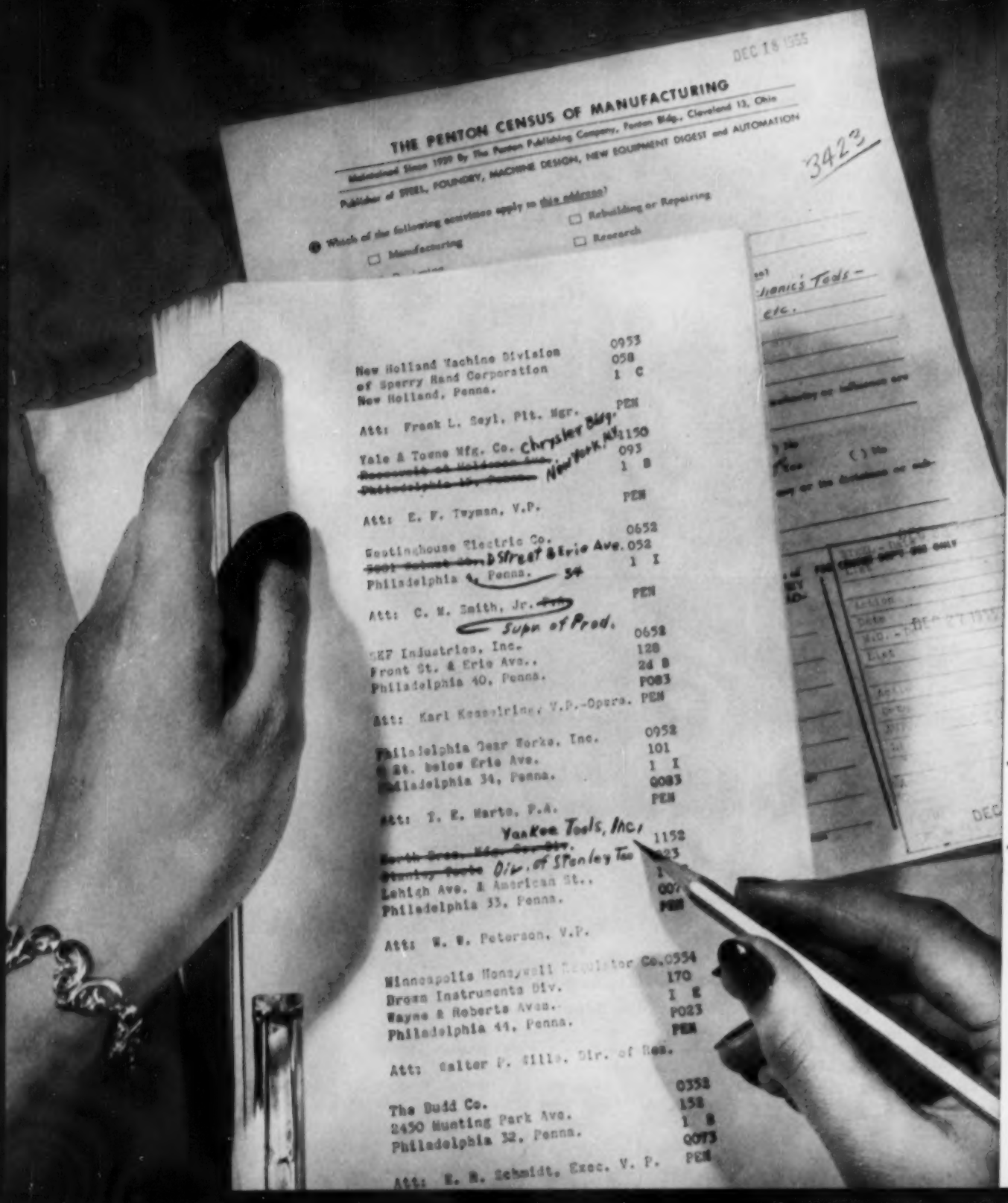
Becker Crane & Conveyor Co., a recently organized firm at 4900 Ridge Rd., Cleveland 9, O., is producing a complete line of overhead cranes and conveyors. Officers are: Frank N. Becker, president;

(*Please turn to page* 100)

Skilled GE Workmen Shape Huge Steam Turbine Forging

Fast taking shape in General Electric Co.'s plant in Schenectady, N. Y., is a 165,000-kw power maker. Here a workman measures the high pressure section steam turbine forging and lays out the grooves which will be cut in it. This is the first of two similarly rated machines which will be installed in Duke Power Co.'s $24-million Allen station on the Catawba river, North Carolina

What's the basic benefit you get



from Penton's million dollar census ?

Our million dollar investment in the Penton Continuing Census is paying *you* big dividends.

How? This is a *Continuing* Census. For 16 years it has been combing the market daily for new plants. It is continuously catching the changes—checking on personnel turnover, product diversification and plant expansion throughout this changing market.

All of this gathering of information doesn't help you one iota. It's the way we *use* it that counts.

You may assume your basic benefit from this million dollar census operation is the market research information you get—but that's *not* it. Important and helpful as such data is to so many of our advertisers—that's only a by-product of our census.

What is the basic benefit you get from Penton's Continuing Census? It is *constantly effective coverage* of your markets. We're using our up-to-the-minute census findings constantly to be sure we're reaching the right men in the right plants.

That's what you want. That's what you get from each Penton publication to make your advertising more effective.

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Abrasive Cutting | *the best way to cut many materials the only way to cut some*

Campbell Cut-Off Machines

WHAT KIND OF A CUT DOES YOUR JOB REQUIRE?

THIS Clean, smooth edges that require no further finishing

or THIS Rough, serrated edges that must be machined if smooth finish is required

• The smooth cut—made on a CAMPBELL Oscillating Wet Abrasive Cut-Off Machine and the just-right ALLISON Abrasive Wheel for the job—saves a grinding operation at a Midwest gear plant.

Another combination of CAMPBELL Cut-Off Machine and ALLISON Wheel cuts stainless steel tube twice as fast as by other methods for a large aircraft manufacturer.

Can you cut tough K Monel, 4¼" dia., in two minutes per cut by present methods? Whatever your problem, our abrasive cutting specialists can improve your cutting operation and save you money.

OSCILLATION makes these big cuts with speed and economy

• The cross section of gear teeth (*shown left above*) is cut smooth, fine-finished and ready for metallurgical study.

It results from the wet cut of an Oscillating CAMPBELL Abrasive Cut-Off Machine with abundant coolant applied just where it does the most good. The Oscillation of the ALLISON Abrasive Wheel, the right one for the job, handles big cuts like this with speed and economy.

If your cutting involves alloy or high carbon steel, this CAMPBELL-ALLISON combination just can't be beat.

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ACCO

Campbell Machine Division
AMERICAN CHAIN & CABLE

925 Connecticut Avenue • Bridgeport 2, Connecticut

(*Concluded from page 97*)

F. L. Bateman, executive vice president; H. H. Homer, vice president; W. F. Wadsworth, secretary; R. H. Gundlach, treasurer.

Plans $1-Million Addition

Lester Bros. Inc., Martinsville, Va., producer of prefabricated homes, is building a $1-million addition to its manufacturing facilities. The project will double capacity.

To Close Farm Implement Plant

International Harvester Co., Chicago, will permanently close its farm implement plant at Richmond, Ind., next spring. "The changing nature of the farm implement market and the characteristics of the plant leave us no choice," says E. F. Schneider, vice president. The plant's principal products have been planting and seeding machinery.

Enlarges Buffalo Warehouse

Carpenter Steel Co., Reading, Pa., opened an enlarged mill-branch warehouse in Buffalo. C. H. Harton, district manager, is in charge of the new facility.

Norton Co. Expands Plant

Norton Co., Worcester, Mass., is constructing a $2-million central service building at its plant in that city. When completed in 1958, it will centralize under one roof the plant's engineering department and a variety of crafts which serve the entire plant. The factory area will house the machine shop, sheet metal shop, equipment repair and similar departments.

Republic Shifts Sales Setup

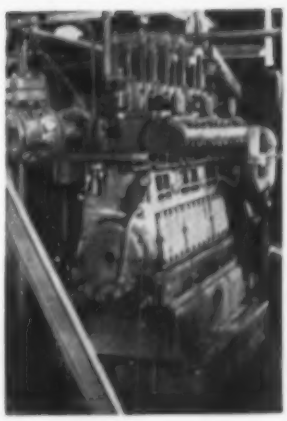
Sales of Republic Steel Corp. sectional plate and Corwel pipe drainage products are being handled through Republic's Sheet Culvert Division, Canton, O. These products were sold through Republic's Sheet & Strip Sales Division, Cleveland. T. F. deCapiteau has been appointed assistant manager of sales of the Culvert Division to direct sales of these products. Culvert sheets for fabrication into

"It'll pay us to replace it with an ALDRICH PUMP!"

Downtime, due to pump failure, is always a costly item. It takes the reliability and freedom from maintenance found in an Aldrich Pump to assure 100% availability of hydraulic power.

The very simplicity of the Aldrich Direct Flow design means horizontal straight line flow from suction to discharge. Reduced space between valves results in higher volumetric efficiency. Fluid-end sectionalization for fast, easy maintenance; changeable plunger sizes; and interchangeability of parts are additional reasons why Aldrich Pumps have earned a reputation for dependable, low cost performance on applications such as die casting, hydraulic press operation, roll balancing, descaling and hydraulic testing.

For your tough pumping problems, it pays to specify Aldrich. Write today for a copy of Data Sheet 100, a condensed catalog and selection chart covering our entire line. The Aldrich Pump Company, 18 Pine Street, Allentown, Pa.



Four 5" stroke Aldrich Direct Flow Pumps on die casting service in a midwestern metalworking plant. These pumps are handling 250 gpm at 1500 psi.

THE ALDRICH PUMP COMPANY

riveted culvert pipe will continue to be handled by the Sheet & Strip Division.

Horning-Cooper Inc. Renamed

Cooper Development Corp., Monrovia, Calif., is the new name of the former Horning-Cooper Inc.

Vickers Forms New Division

Vickers Inc., Detroit, manufacturer of hydraulic systems and components, established an Automotive Division under Ray C. Conner, general manager. The division is responsible for sales, engineering, manufacture and service of power steering pumps and other devices for passenger automobiles.

NEW ADDRESSES

Luria Bros. & Co. Inc. moved its Birmingham offices to 1501 First National Bank Bldg., that city. Herbert B. Luria III is manager.

David J. Joseph Co. moved its Birmingham offices to 1906 Ninth Ave. S., that city. Richard Fechheimer is manager.

Farrel - Birmingham Co. Inc. transferred its roll grinder sales and service department from its home office in Ansonia, Conn., to its Consolidated Machine Tool Division in Rochester, N. Y.

Durant Tool Supply Co. moved to 1 Thurbers Ave., Providence, R. I.

Toolset Inc. moved to enlarged quarters at 1411 Military Road, Buffalo, N. Y. The firm makes self-stripping units for piercing and notching materials. The move releases space for expansion of machine shop facilities at 2183 Elmwood Ave., that city.

Banner Metals Inc., fabricator of wire and metal products, moved into a 54,000-sq-ft plant at 2959 Victoria St., Compton, Calif.

Jeffrey Mfg. Co., Columbus, O., opened a warehouse at 1862 Rollins Road, Burlingame, Calif. The

H-P-M 1000-ton FASTRAVERSE sheet metal drawing press equipped with a 300-ton die cushion and 400-ton blankholder.

50% REDUCTIONS CUT DRAWING COSTS

"We're Very Pleased With Our H-P-Ms"

Mr. Homer F. Folk, Manager of Pressed Steel Department at A.C.F. Industries, Milton, Pa., reports, "We need an all-around versatile press and our H-P-M can be easily and quickly set-up and regulated for each specific draw job. The accurate control of drawing speed plus total elimination of high impact stresses guarantees proper metal flow and is one of the important factors in making reductions of 50% in one operation possible."

The H-P-M FASTRAVERSE press is infinitely adjustable for a multitude of drawing requirements. Independent control of each hydraulic action provides just the right tonnage for each job. Investigate these versatile all-hydraulic production units. Draw your sheet metal hydraulically. Write today for complete information.

HPM

THE HYDRAULIC PRESS MFG. CO.

Mount Gilead, Ohio, U.S.A.

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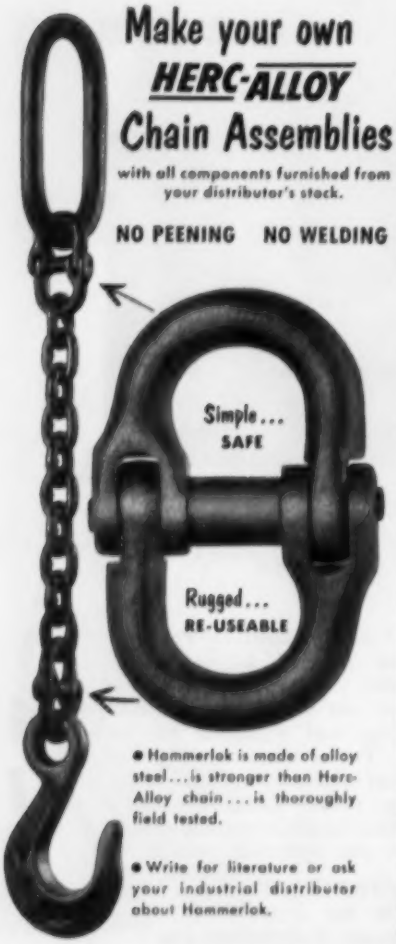
Make your own
HERC-ALLOY
Chain Assemblies
with all components furnished from your distributor's stock.

NO PEENING NO WELDING



● Hammerlok is made of alloy steel...is stronger than Herc-Alloy chain...is thoroughly field tested.

● Write for literature or ask your industrial distributor about Hammerlok.

● MADE BY the makers of Herc-Alloy... the original alloy steel chain.

CM
HOISTS AND CHAIN

COLUMBUS McKINNON
CHAIN CORPORATION
TONAWANDA, NEW YORK
DISTRICT OFFICES: NEW YORK
CHICAGO • CLEVELAND
In Canada: McKinnon Columbus Chain Limited, St. Catharines, Ontario

firm's San Francisco sales headquarters also was moved into the new building. Jeffrey makes mining machinery, processing, conveying and power transmission products.

CONSOLIDATIONS

Twin Coach Co., Kent, O., purchased **Luther Corp.** and **United States Outboard Inc.**, both of Warsaw, Ind. Luther makes small boat trailers; U. S. Outboard builds cruisers, molded plywood and flat panel hulls. Operations will be merged into a new company, North American Marine Inc. Its officers are: Edward P. Taylor, president; R. F. Meyer, executive vice president; R. M. Lohr, secretary and treasurer.

Merger of **West End Chemical Co.**, Oakland, Calif., into **Stauffer Chemical Co.**, New York, has been approved by stockholders.

Walworth Co., New York, acquired **Grove Valve & Regulator Co.** and **Grove Controls Inc.**, both of Oakland, Calif.

Towmotor Corp., Cleveland, acquired **Gerlinger Carrier Co.**, Dallas, Oreg., manufacturer of large capacity fork lift trucks and straddle type industrial trucks. Gerlinger will be operated as a wholly owned subsidiary of Towmotor. Production of certain Towmotor parts and assemblies for west coast delivery will be shifted to the Dallas plant. Production of Gerlinger equipment to be sold in eastern markets will be transferred to Towmotor's Cleveland plants.

American Can Co., New York, purchased **Bradley Container Corp.**, Maynard, Mass., manufacturer of extruded plastic tubes and bottles. Officers of the new subsidiary are: W. C. Stolk, president; L. A. Britzke, vice president and general manager.

American Chemical Paint Co., Ambler, Pa., purchased **Benjamin Foster Co.**, Philadelphia, which specializes in industrial coatings and adhesives for the protection of thermal insulation and protective

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METAL
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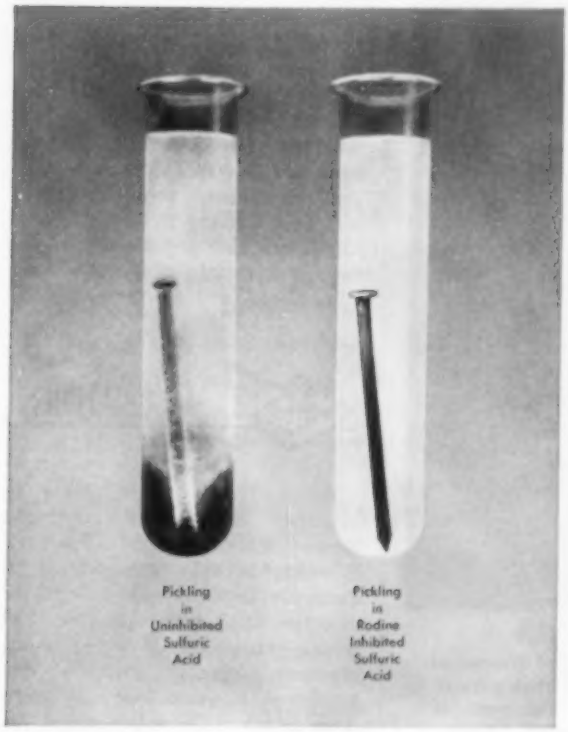
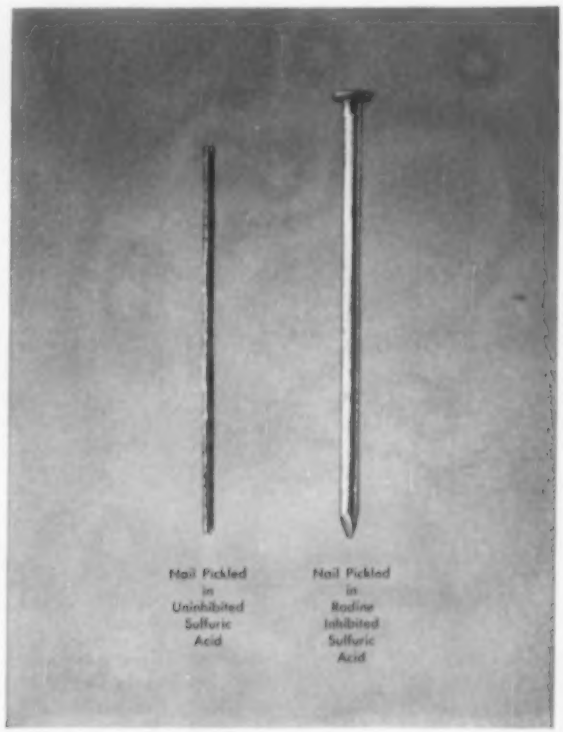
HOW RODINE® CUTS PICKLING COSTS

Tests demonstrate the effectiveness of Rodine in retarding the attack of acid on the metal

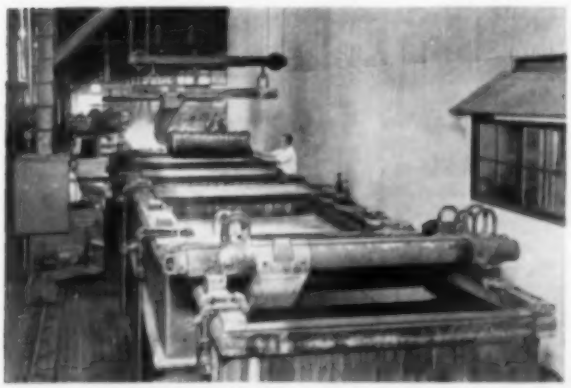
Rodine pickling acid inhibitors retard the attack of the acid on the metal without affecting the ability of the acid to remove scale. Their effectiveness in saving acid and metal is demonstrated by these two simple tests:



Formation of Hydrogen Test. Both test tubes contain a 10% by volume solution of sulfuric acid. In the left-hand tube, the acid is uninhibited. In the right-hand tube, a Rodine inhibitor has been added in an amount equal to 1% by volume of the concentrated acid. There is no bubbling in this tube—Rodine has retarded the formation of hydrogen that is the result of acid dissolving steel.



Less of Weight Test. Both nails have been pickled in a 10% by volume solution of sulfuric acid for the same length of time. The nail pickled in the uninhibited sulfuric acid solution has lost its form, does not look like a nail any more. The nail pickled in the sulfuric acid solution with Rodine added has lost little weight, has retained its shape and luster.



Rod and wire, tube and sheet are pickled clean with Rodine, without wasting either acid or metal—there are fewer rejects, which means big savings.

Not only does Rodine save metal and acid, but it improves the quality of the pickled product as well. And baths containing Rodine can be operated longer with less acid required to keep them at the desired concentration.

Our treatise on pickling and the use of Rodine, "Efficient Pickling with Rodine," gives full information. Send for your copy today—it makes profitable reading.

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DETROIT, MICHIGAN
NILES, CALIFORNIA
ST. JOSEPH, MISSOURI
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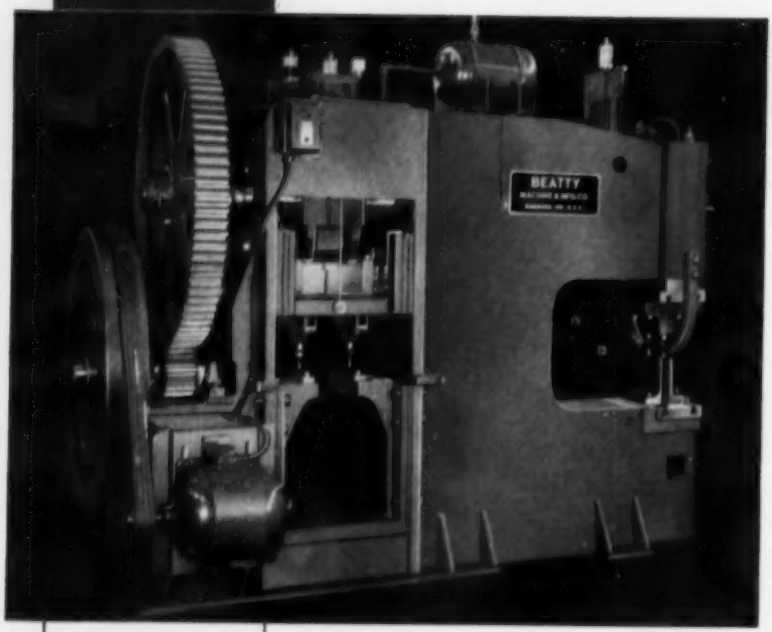
CHEMICALS ACP PROCESSES

BEATTY
NO. 7 DETAIL BEAM PUNCH

New Detail Beam Punch Speeds Single-Hole Punching



Web Punch End One set single gag punch tools

Flange Punch End Two sets of single gag punch tools

In just three passes, instead of the usual five, this Beatty Detail Beam Punch punches flanges on either side of the webs of beams, as well as webs of beams, angles, channels and plates — eliminates the end-for-end turning of beams.

Incorporating an entirely new design that speeds single-hole punching, this compact new punch saves floor space and reduces your equipment investment by handling the work of three ordinary machines. Mechanically driven, it is of 100-ton capacity, open-throat and guillotine type, and will punch up to a 1¼" hole through 1" mild steel.

Write For Full Details

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966 150th St.,
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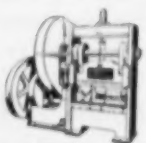
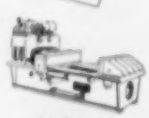
Guillotine Beam (Flange) Punch



Guillotine Bar Shear



Horizontal Hydraulic Bulldozer

coatings for metals and concrete surfaces. ACP makes metalworking chemicals.

Topp Industries Inc., Los Angeles, purchased **Heli-Coil Corp.**, Danbury, Conn., producer of thread inserts and precision tools. Topp recently purchased Haller, Raymond & Brown Inc., State College, Pa., an electronics research and development firm.

Hoover Ball & Bearing Co., Ann Arbor, Mich., will purchase **Gerity-Michigan Corp.**, Adrian, Mich., subject to approval by stockholders. Hoover makes balls and bearings; Gerity is a large independent electroplater. About a year ago, Hoover acquired Universal Die Casting & Mfg. Corp., which has zinc and aluminum die-casting plants at Saline and Fowlerville, Mich., and Malvern, Ark.

ASSOCIATIONS

Harry H. Steidle resigned as manager of the **Prefabricated Home Manufacturers' Institute**, Washington. He is succeeded by Conrad (Pat) Harness, formerly director of public relations, National Association of Home Builders and presently executive vice president, Houston Home Builders Association. He will assume his new duties on Nov. 1.

Jay Doblin, director, Illinois Institute of Technology, Chicago, was elected president of **American Society of Industrial Designers**, New York. Other officers are: William Goldsmith, vice president; Francis Braunn, treasurer; and Kenneth Van Dyck, secretary.

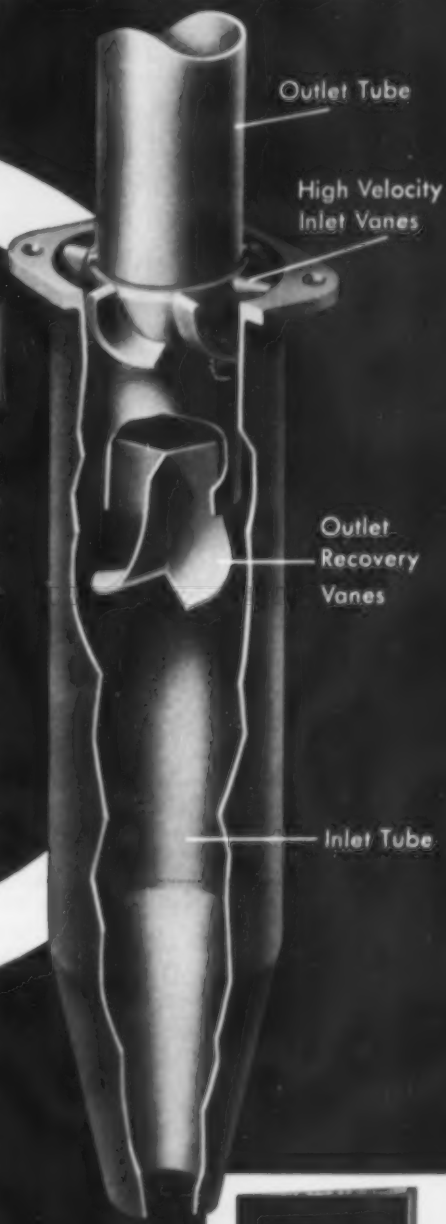
James W. Vicary, president, Ervite Corp., Erie, Pa., was elected president of the **Porcelain Enamel Institute**, Washington. He succeeds Glenn A. Hutt, vice president, Ferro Corp., Cleveland. Mr. Hutt was elected to the newly created position of chairman of the board of trustees. Re-elected: P. B. McBride, Porcelain Metals Corp., Louisville, treasurer; John C. Oliver, managing director and secretary.

NEW Cyclo-trell

multiple tube dust collector

Here are a few brief facts on Research's new multiple tube mechanical collector.

- Collection efficiencies are higher, for a given pressure drop, than other conventional multiple tube collectors.
- Gas flow per tube is higher than conventional units. This means fewer tubes per collector and lower total cost for a given capacity.
- Cyclo-trell's design is based on Research's 45 years experience in manufacturing gas cleaning equipment. As the largest manufacturer of electrical precipitators in the world, Research-Cottrell has engineered and built many combination units consisting of precipitators and mechanical collectors.



Higher Collection Efficiency

An important reason for Cyclo-trell's higher collection efficiency is the aerodynamically shaped inlet vane unit. The purpose of these vanes is to produce a fast spiral of incoming gas. The faster these gases spin, the greater the centrifugal force on the suspended dust.

After testing many types and curvatures of vanes, Research found that this new design resulted in less turbulence, greater centrifugal force and higher collection efficiencies.

Greater Gas Handling Capacity

To develop a higher gas flow capacity than other multiple tube collectors, Research's engineers developed the following design features. First, by using a 10" diameter inlet tube, instead of the conventional 9" tube, the flow of incoming gas was increased.

The next step was to straighten the gas flow as it entered the outlet tube, since a spiraling gas stream creates more resistance than a straight through flow. In the Cyclo-trell this spiral is eliminated, and energy is recovered, in the outlet tube by the Outlet Recovery Vanes. By positioning these vanes below the tube, rather than inside, resistance has been further reduced.

This combination of features means greater gas flow per tube, fewer tubes per collector and a lower total cost for a given capacity and efficiency.

Bulletin M gives complete details on design features, efficiency, capacity and detailed dimensional drawings. Write for your copy today.

Research-Cottrell, Inc.

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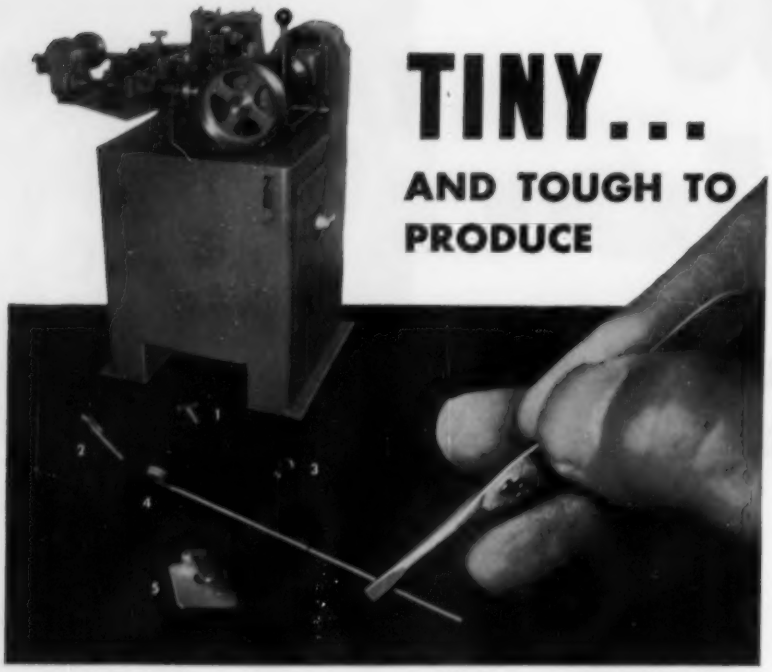

TINY...

AND TOUGH TO PRODUCE

INTRICATE FORMING IS AUTOMATIC ON A NILSON 4-SLIDE

Small wire and ribbon metal forms shown here in actual size are typical examples of modern precision production on a Nilson #00 4-Slide. Compact in size, this 4-Slide produces up to 375 pieces per minute in material not exceeding .040 dia. and 3" in blank length. Easy access to tooling, accurate feeding to within .003, and rugged construction assures years of precision forming.

1 Mercury Switch Part . . . .014" x .019" platinum wire, formed with tolerances within .001" on over-all length. Production rate, 175 per minute.

2 Electrical Contact . . . .0076" x .0030" wide phosphor bronze formed at a production rate of 200 per minute.

3 Swivel Part . . . .025" brass wire. Heading operating includes eye formed with tolerances within .008", shank within .003 tolerance. Production rate, 300 per minute.

4 Leadwire . . . .026" soft tinned copper wire formed at a rate of 140 per minute with two 7/64" diameter windings.

5 Contact Part . . . .010" x 3/8" wide phosphor bronze formed at 175 per minute.

Nilson makes a complete line of versatile 4-Slides . . . accommodating wire diameters up to 1/2", feed lengths up to 32", and ribbon metal up to 3" width . . . with press capacities ranging to 75 tons.

Nilson provides specific forming recommendations from detailed information. Send for A. H. Nilson catalogs . . . the first step to increased production.

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Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

9

STEEL's 1956 Management Series . . .

STEEL's editors herewith present the ninth in their ten-part series, Program for Management for 1956. The complete list:

1. **It's Time To Grow**
   (Feb. 13, p. 81)
2. **Know Your Costs**
   (Mar. 19, p. 83)
3. **Ideas for Industry**
   (Apr. 23, p. 105)
4. **Metalworking Goes to Market**
   (May 14, p. 107)
5. **Metalworking's New Horizons**
   (June 18, p. 137)
6. **How To Live with SUB (Supplemental Unemployment Benefits)**
   (July 16, p. 121)
7. **To Merge or Not To Merge**
   (Aug. 13, p. 89)
8. **Motivating Men To Produce**
   (Sept. 24, p. 105)
9. **Automation—Bogeyman or Bonanza?**
   (Oct. 15, p. 109)
10. **Industry and College—Partners in Development**
    (Nov. 12)

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Automation—Bogeyman or Bonanza ?

DESIGN engineers told a test pilot: "Your days are numbered; before many months, automatic controls will be running these new planes from the ground."

Replied the pilot: "I'm not worried. You have yet to improve upon man—a control mechanism that weighs about 150 lb, has five senses, six degrees of freedom, is completely self-contained, self-powered, self-lubricated. Above all, you have yet to invent a control device so readily and easily produced by inexperienced labor."

In short, in this dawning era of controls and automation, man will still be in the picture, despite the contrary impression given by some of the nonsense written and spoken about the subject.

Three Fallacies

That nonsense has helped give credence to three major misconceptions about automation which could make a bogeyman instead of a bonanza out of a technical, sociological and marketing evolution.

The technical fallacy is summed up in the criticism that "automation is so complex that it's for big companies only."

The sociological untruth turns up in the common statement that "automation will force technological unemployment."

The danger in marketing is the belief in some quarters that "automation is a technical, not a marketing evolution."

Where do these misconceptions come from?

One source is the press. A business magazine put this headline on a story about Ford Motor Co.'s automated engine plant in Cleveland: "Automation — A Factory Runs Itself." At that plant, Ford uses some 2700 direct production line workers.

Another source is management

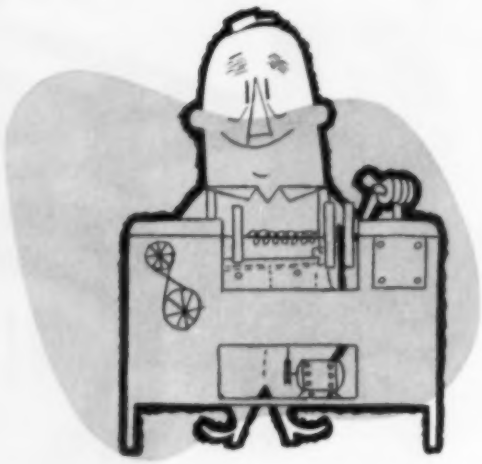
The What and Why of Automation . . .

In 1900, I produced

$2,612

In goods and services

27.3 million workers
worked 59 hours a week
at 81 cents an hour
to produce $71.3 billion worth of
goods, services
for 76.1 million people



In 1940, I produced

$4,452

In goods and services

46.7 million workers
worked 44 hours a week
at $1.34 an hour
to produce $207.9 billion worth of
goods, services
for 132.1 million people

All monetary figures in constant 1956 prices.
*Estimated. 1975 wage rate arrived at by assuming a 3½-per cent annual productivity improvement, which, compounded yearly, would nearly double current wage rates in 20 years.
Sources: Department of Commerce, National Industrial Conference Board and STEEL.

itself. In a mass circulation publication, a company executive wrote: "We operate what is probably the only automatic factory in the U. S. It uses 20 per cent less labor."

Some labor leaders add fuel to the flames. Listen to Walter Reuther: "While we realize the potential benefits of automation, we must not minimize the problems (it brings) for individual workers. If we subscribe to laissez faire, automation can do untold harm to millions of innocent people."

One reason why the editor, the businessman and the labor leader make such statements is that they don't know what automation is.

Roger Bolz, editor of *Automation*, says: "Automation is the science and technology of manufacturing, processing or performing services as automatically as possible within the limits set by economic necessity or practicality."

The 1956 edition of *Webster's New World Dictionary* defines it this way: "In manufacturing, a system or method in which many or all of the processes of production, movement and inspection of parts and materials are automatically performed or controlled by self-operating machinery, electronics etc."

Don't be alarmed by those definitions. They mean this: As the accompanying exhibit shows, automation is the latest step in man's evolutionary (not revolutionary) development from manual production. Or as Henry Ford II puts it: "Actually, it's a handy means of describing something industry has been doing for years—improving the methods of production."

Why Automation?

Errors in understanding have also popped up because few people know why automation has entered our lives.

In 1975, I'll produce

$8,015

In goods and services

91.7 million workers
will work 35 hours a week
at $3.74 an hour
to produce $735 billion worth of
goods, services
for 221 million people

Servomechanisms, digital computers and all the rest of the recent developments make automation *possible*.

Economic and sociological pressures make automation *necessary*.

The principles of the automobile were known as far back as the 1880s, but the automobile didn't show signs of what it was to become until the second decade of this century when it started to become a necessity. Similarly, the technical principles of automation have been known, in theory, at least, for several decades. Now the economic and sociological conditions have come about to provide the correct climate for automation.

What are those conditions?

The first one is costs and profits. In 1950, a fair year, net manufacturing profits after taxes were 7.1 per cent of sales and 15.4 per cent of net worth. In 1955, a sensationally good year, those net profits were 6.7 per cent of sales and 15 per cent of net worth. Costs are steadily rising; profits dropping over the long pull. Automation will help reverse that trend.

The second condition is the need for greater productivity to keep our rate of improvement in living standards going up steadily.

Our rate of increase in productivity has been declining since 1919, according to figures developed by the Bureau of Labor Statistics. In basic steel, output per man-hour showed these average annual percentage increases:

1919-1929: 6.3
1929-1939: 3.1
1939-1947: 2.9
1947-1955: 2.9

In total manufacturing, the picture of average annual percentage gains is this:

1919-1929: 5.3
1929-1939: 2.2
1939-1947: 0.5
1947-1953: 3.4

Some experts believe that in the next 20 years America must show an average annual increase in output per man-hour of at least 3.5 per cent. The above figures reveal that we have been able to do this only in the decade following 1919. Significantly, that was a period of great technological and marketing innovations.

The metalworking employee in 1955 produced $22,800 worth of goods. In 1975, that same employee must turn out $49,600 worth (at 1956 prices) to supply the greater population and the expected greater demands from that population. If he can't, our living standards won't improve at the rate they have in the past, and they may even become static. Automation is the answer to the need for productivity.

Defeating the Bogeyman

A small girl was afraid of fire engines. Her father took her to the fire station where she touched and examined the machine. A fireman explained that the engine was to protect her from harm. He let her blow the siren. She hasn't been afraid of fire engines since.

Isn't it time that we all learn what this siren on automation is all about? A fear in the 1930s of what mechanization would do to employment helped to paralyze the modernization of British coal mines. Look at the state of Britain's coal industry today.

Many labor leaders are undoubtedly sincere in their fear that automation will cut employment. The truth is it can displace employment temporarily, but the com-

Marketing's Three Ages . . .

Conversation

1900: Sales determine production

Guesstimation

1940: Blind-flying production hopes to match sales

pletely automatic factory is a myth.

Fred Crawford, chairman of Thompson Products Inc., recalls that 38 years ago his company had 200 workers. Since then, it has been buying all the labor-saving machinery it could lay its hands on to get rid of those 200 workers. Today, Thompson's employment is 21,000.

James R. Bright, lecturer on industrial management at Harvard's School of Business, investigated 13 plants that have automated. Employment in 12 is now higher than it was before the move—usually because the plant has more business than formerly.

Automation is no threat to labor; it's a salvation.

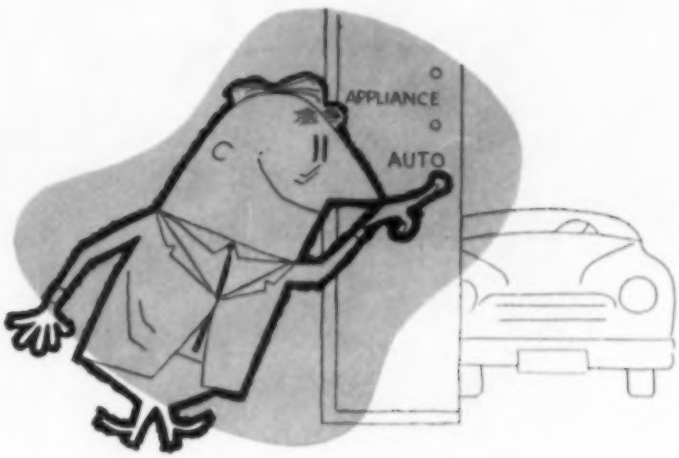
E. I. du Pont de Nemours & Co. Inc. says that if productivity is as high in 1957 as it is today, we will be "short 76 billion man-hours of labor." That's a lot of overtime—no employer could pay it; no worker could work it. But jobs can be less arduous, more productive, better paid with automation.

How can you convince hourly workers of that? H. T. Rowe, director of information at International Business Machines Corp., answers: "Better public relations." Public relations people advise: "Give the straight facts as rapidly as possible. If there will be displacements, admit them. But if there will be estimated future gains in employment, resulting from your automation program, dramatize them, too." Firms like Du Pont and General Electric Co. point out the labor facts of automation in their annual reports, in house organs, in employee news letters. General Motors Corp. has given one man the job of writing a book for employees which will show how automation can benefit, not harm, workers.

Here's how automation can get a bad name: The three weeks' strike at British Motor Corp. this summer was generally regarded by the American press as a strike against automation. True, BMC did lay off 6000 workers, but declining sales was the major reason. The unions finally saw their fight as one for compensation for the men laid off and a guarantee that future layoffs would not be made without notice.

That automation has had its effects on the British automotive industry is shown by Austin Motor Co.'s experience. Its labor force is now about the same as before

As the gap between customer and maker widens, the need for a Henry Ford of marketing grows more urgent



Automation

1975: Production determines sales; market research determines production

World War II, while "there has been a huge increase in output."

But the worker isn't the only one who must defeat the automation bogeyman. Some management men have their fears, too. One automotive company currently campaigning to get some of its suppliers to automate reports tough going. "They claim it's too expensive, or they haven't the engineering to cope with it, or they need a three or four-year guarantee of our business."

The last mentioned, an assured market, is the hard core of management's fear. Many businessmen are still smiling (but shuddering inwardly) at a cartoon showing a man rushing up to Automated Widget Inc.'s plant one morning. Widgets are pouring out of every window. "My heavens," gasps the man, "I forgot to press the 'off' button last night."

How are you going to sell all those widgets? That's the bogeyman for management.

Automation as an absolute first condition requires the establishment of a predictable, stable and expanding market. Economic and sociological pressures force automation on us; automation forces new marketing concepts on us. As Economist Peter Drucker points out, to apply automation to the manufacture of kitchen appliances, such as ranges, dishwashers and automatic washing machines, would require an organized market for second-hand appliances. It might even be necessary for the manufacturer to stop selling appliances entirely. He might have to sell the housewife a five-year service policy, with the appliances on loan or at a nominal rent. At the end of five years, they would be replaced by new appliances, making possible a predictable production schedule.

Fantastic? Management at GM's Frigidaire Division has been toying with just such notions.

The building of a constant market will also require a more complete circuit of communication. Now, the manufacturer-customer flow of information largely goes from the maker to the buyer. But with the expense of automation, we will have to know more about what the customer wants. Needed are improved ways to get better communication from maker to user and back.

Management must know more about automation. Early this month International Harvester Co. held a two-day conference on "Progress through Automation" for some 280 key manufacturing and engineering personnel to: 1. Exchange information among people of all divisions. 2. Insure that those men are fully acquainted with management level thinking about automation. 3. Provide a review of recent advancements in the field. 4. Provide thought-provoking sessions to stimulate new ideas and interest on the part of each participant.

GE's P. H. Alspach, manager of the Equipment Development Laboratory, Manufacturing Services, says: "Today, the challenge of automation has shifted from the manufacturing area into the management area." He and a few others like him in industry have a new assignment: Sell middle management in their own companies on the need for automation; analyze how various management job functions will change under the impact of automation. Mr. Alspach points out, for example, that the development will increase the technical content of the manufacturing area. He advises establishing a manufacturing engineering group in the manufacturing function.

Mr. Alspach points out that automation forces a closer relationship between marketing and engineering functions than ever before.

Those are the types of changes that some people resist. How to defeat the bogeyman of change? One way is to show examples of

where automation has been successful—like these:

Winning the Bonanza

The old complaint about automation being for big companies only doesn't hold water, particularly not for Lee Silver Service Co., a Detroit plating job shop. Lee Radke, its president, started automating five years ago with the purchase of 60 ft of conveyor belting for $600. He has been automating his plating lines ever since. Five years ago, the 40-man company had sales of $500,000. Mr. Radke employs 295 now and grossed $5.5 million last year.

Nor does a company have to automate everything to reap benefits. Bell & Howell Co. needed an inexpensive ($49.95) 8 mm movie camera for competitive reasons. It designed one, but found itself losing money on every one sold for the first six months.

Automation on one phase of the operation solved the problem. Under the old methods, raw castings (camera doors and housings) were trimmed and deburred by hand. Now the diecastings are conveyed among various types of power equipment for buffing, grinding, sanding etc. Manufacturing time was cut 73.5 per cent, and the complete installation was paid for in five months from the savings realized. What's more, B&H even could eventually reduce the price to $39.95.

Do special problems in a specialized field make automation impractical? Not for Lewyt Corp., Long Island City, N. Y., which has designed and built 87 special units for its own automation program to produce electronic equipment, vacuum cleaners and air conditioners. For example, one machine is a double reaming device to trim aluminum elbows for vacuum cleaner floor nozzles. One man feeds the elbows to the machine. Production is running 300 per hour. With old techniques, three operators could produce only 100 in that time.

Situations undoubtedly exist where automation isn't feasible in manufacturing. How about the office or warehouse?

Datamatic Corp., Newton High-

Automation Reaps a Bonanza

Stromberg-Carlson Division, General Dynamics Corp., Rochester, N. Y.

Through automated production of battery-powered portable radios, material savings of 3.5 per cent and labor savings of 37.5 per cent were found possible. Automatic assembly forces the position of each component connector to be exact. Testing can be done on some form of a jig by comparatively unskilled operators. That saved half the highly skilled technicians for other work.

Carborundum Co., Niagara Falls, N. Y.

By using beta gages to test the quality of coated abrasives as they are manufactured, Carborundum saved $13,000 in materials (the company used to cut out samples from the continuous production sheet); $12,000 in reduction of down time for the machines; $45,000 in material utilization; $15,000 because of reduced rejects.

Convair Division, General Dynamics Corp., Los Angeles

It developed an automatic milling machine which reduces lead time on some parts as much as 85 per cent; 15 per cent on complex parts.

Dixie Cup Co., Easton, Pa.

Using higher speed machines and automated lines, Dixie Cup boosted its total work force 60 per cent in ten years, increased production units by 300 per cent.

Electrical Product Maker

It designed its product to better automate production and saved 40 per cent in material costs. It cut plant overhead 10 per cent because less floor space was required for the automatic machinery.

General Motors Corp., Detroit

Although GM is one of the major practitioners of automation, and although most of the equipment for automation has been installed in the last ten years, its employment has jumped from nearly 312,000 in 1946 to more than 617,000 now.

Ford Motor Co., Dearborn, Mich.

Ford is almost synonymous with automation. One of its executives (see page 116) coined the word. Its foundry in Cleveland has probably had more publicity than any other automated facility in the country. Most of this automation has occurred since 1946 when total employment was 115,000. It's 180,600 now.

Ohio Bell Telephone Co., Cleveland

The firm had 3459 telephone operators in 1935 when it was 58 per cent dial operated. In 1955, when it was 94 per cent automatic, 8030 operators were employed. Total employment in the 20 years jumped from 8158 to 21,486, despite the much greater proportion of automatic equipment.

lands, Mass., claims a large electronic data-processing system, suitable for office paper work, becomes a good buy when annual gross sales are 100 times the annual cost of the system. It says a $2-million system can be afforded by a $36-million-a-year company.

Walter Kidde Constructors Inc., New York, has designed an automated warehouse. A conveyor system and electronic controls can be teamed to reduce warehouse operating costs as much as 50 per cent; to save up to 25 per cent in floor space; to provide maximum control; and to enable the shipping department to predict the time needed to process any order.

Still not convinced? Then, consider the intangible, but important, benefits that accrue to your labor force. Ford Motor Co. reports: "From 1947 through 1954 our accident frequency rate went from 10.30 disabling injuries per million hours worked to 1.97—an 81 per cent reduction. Automation can't take all the credit for this improvement, but it certainly can take credit for a good share of it."

And what about labor's fears of dismissal? The nationalized Renault auto factory near Paris has reached what Ford officials call the highest degree of automation of any motor maker in the world. The feat has been accomplished with no reduction in the labor force and little resistance from the workers.

Since World War II, output has quadrupled, while the labor force has risen 15 per cent. Between May, 1955, and July, this year, production rose from 875 to 1260 vehicles a day, with an increase in the work force from 52,000 to 53,000.

One Renault labor leader says: "We have had many strikes and bitter quarrels here, but never over automation. If technical changes are carefully planned, they can only benefit the worker."

Conclusion

Automation or continuous automatic production naturally will grow out of more complete mechanization. We have largely progressed through the manual area into the mechanization area and

Ford's Del Harder:

Let's Understand Automation

Automation means better quality products, more inspections per component, tighter inventory control, says D. S. Harder, executive vice president, basic manufacturing divisions, Ford Motor Co. We can't afford to back away from the benefits of automation.

Automation might be called a supplement to the production worker. An example: A machine is capable of turning out 100 cylinder blocks an hour, each block weighing about 198 lb. It certainly is not practical for the machine operator to handle the physical load. Machine power takes over the burden, makes the operation safe.

Automation is more of a refinement of the industrial revolution than a basic change of concept. Our future mechanization is based on what we feel will be the best possible methods available when all facets of progressive manufacturing have been explored.

We firmly believe it is better for a man to operate equipment that automatically conveys, machines, finishes and delivers parts to the next operation than it is for him to perform these tasks manually. Man and machine have become a team, with man always the master.

The American worker has a direct and personal stake in the future of automation. He can claim that through his efforts—aided by machines—he has created the best work force in the world. And don't forget that the worker on an automation line has greater mental responsibility, but can go home less tired, more relaxed and with a sense of pride in his accomplishments that he is more than a human carrying contrivance.

We must continue to fight the fear of automation. When the machine was first introduced in quantity, it was feared that men would be replaced, that skilled and trained workers would no longer be needed, that poverty would creep over the U.S. Time has proved that the Machine Age is a boon—not a bugaboo.

Manufacturers, large and small, have to make a choice. They can heed the warnings of uninformed doom prophets and retard our industrial progress—a road leading to oblivion. Or we can all have faith in ourselves and our ability to harness the potential of this new phase of industrialization for the benefit of all.

are testing the water in automation's realm. Any discussion about whether automation is desirable is a futile intellectual exercise. We might as well argue whether the tides and the seasons are desirable.

The dawn of mechanization at the turn of the century brought a new era of lower costs and a higher standard of living than would have been possible in a manually operated economy. Now, we are approaching the upper limits of cost and labor reduction possibilities in a mechanically operated economy. We need a new breakthrough—and it will come through automation.

But how rapidly and how completely? That's the point worth discussing.

A survey by the American Society of Tool Engineers suggests that 16 per cent of all metalworking operations could be automated profitably at once, but only a small part of this is being done. Why?

Danger is: Automation will come slowly and incompletely if the fears among some blue and white-collar workers aren't quickly allayed. Even where automation is tried, the effort may be abortive if continuous marketing concepts aren't tied in with continuous production.

Technical problems in automation remain, but they're being solved. Yet, human and managerial difficulties continue to plague us. Failure to dispel them will mean that automation is truly a bogeyman. Success in resolving them will mean automation can bring a bonanza—a $372-billion metalworking market by 1975.

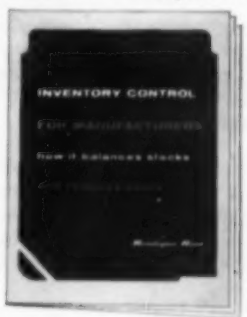
is it profitable?

Inventory represents about one-third of the capital invested in manufacturing and usually is the largest item on the balance sheet outside of plant and equipment.

Inventory difficulty exists in two opposing forms: one is oversupply, the other is shortage. OVERSTOCKS result in increased investment, useless tying up of capital, increased insurance, more floor space for storage purposes, deterioration and obsolescence, and other substantial losses. UNDERSTOCKS result in lost sales, extra expense of "rush" orders and last minute buying, and idle shop time waiting for material.

Profitable manufacturing inventories are obtained by balancing the costs of "getting" raw materials and finished goods against the costs of "keeping" them — the more inventory in the stockrooms the greater the cost.

Remington Rand's comprehensive, new illustrated booklet, "Inventory Control for Manufacturers," is filled with the most effective, modern techniques for balancing stocks and reducing costs.



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Don't miss this opportunity to get the full picture of what Inventory Control means to Management, Production, Purchasing and Sales. Upon inventory availability and adequacy depend scheduling, workflow and delivery — even such human factors as job stability and good labor relations. Inventory Control is the backbone of all manufacturing operations.

No two plants have the same problems but the principles of a good inventory control record as outlined in this booklet, may be profitably adapted and applied to the needs of any business.

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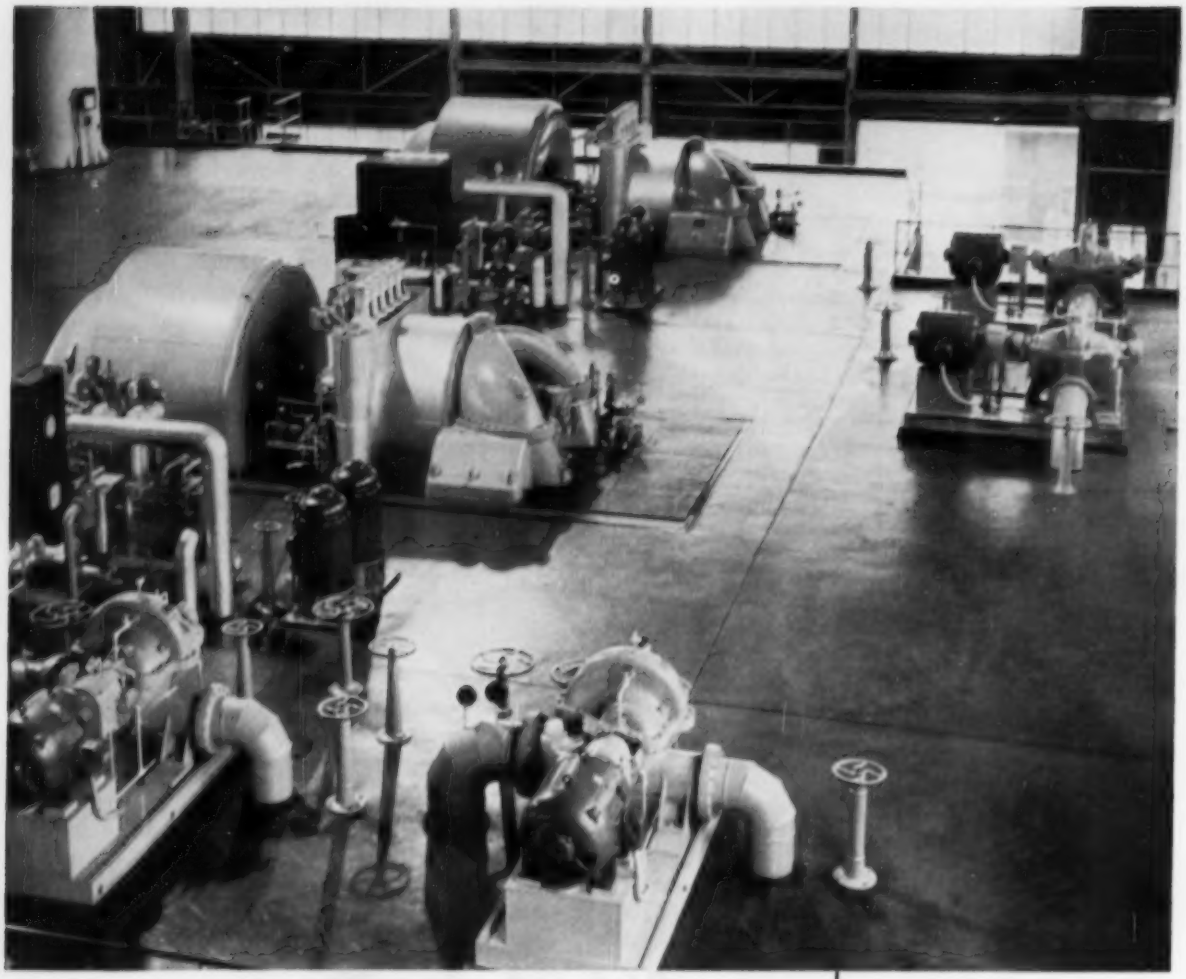

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Here's the blast-furnace blower room of a large steel mill. In it, there are two 100,000 cfm I-R Turbo-Blowers—identical twins, each complete with I-R steam turbine drives, surface condensers, circulating pumps and condensate pumps. Unit No. 1 was installed in 1948, followed by Unit No. 2 in 1953.

Repeat orders like this are a real vote of confidence in I-R turbo-blower equipment. Confidence that's multiplied a hundred fold by similar installations in leading plants from coast to coast. Confidence that explains why Ingersoll-Rand sells more—*far more* large heavy-duty blast-furnace blowers than any other manufacturer. Ask your I-R representative for full details on the blower best suited to your needs.

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STEAM-JET AIR EJECTOR . . .
Twin element, 2-stage . . . mounted on Surface Inter-and-After-Condensers.

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STEEL
October 15, 1956

Technical Outlook

INVESTMENT CASTING ALLOY— Haynes Stellite Co., a division of Union Carbide & Carbon Corp., New York, says it has been licensed to make and sell GMR 235, a new high temperature alloy developed in General Motors Research Laboratories. Uses: Investment cast turbine wheels, buckets and vanes that operate at over 1400°F.

AIR LIFT— Workmen at Buick Motor Division, Flint, Mich., no longer lift huge quantities of steel every day—air mechanisms do it for them. More than 700,000 lb of steel parts a day move through pneumatic automation equipment, a big factor in reducing employee fatigue and improving safety.

NEW APPROACH— Porcelain enameled aluminum coated steel offers new market possibilities in the architectural field, says John Winget, manager of marketing service department, Armco Steel Corp., Middletown, O. The statement was made at a meeting of the Porcelain Enamel Institute.

LAY IT ON— Printed circuitry, radar and other electronic devices may get a big boost from a highly conductive coating introduced by Acheson Colloids Co., Port Huron, Mich. Essentially a colloidal dispersion of copper particles, it is easier to apply than foil, requires no baking or heating, dries in a few minutes.

FLUXLESS BRAZING— Lepel High Frequency Laboratories Inc., Woodside, N. J., has developed a production fixture to induction braze metal assemblies without flux. It uses a controlled atmosphere. Three work stations are operated from a single heating unit. A glass or Plexiglas bell covers the workpiece during heating and holds the purified gas.

BRIGHT FUTURE— In making aluminum furniture, you can eliminate buffing by using prefinished, seamless tubing developed by Harvey Aluminum, Torrance, Calif. It stays bright and resists scratching. You can get it in two tensile strengths: 30,500 psi and 40,000 psi.

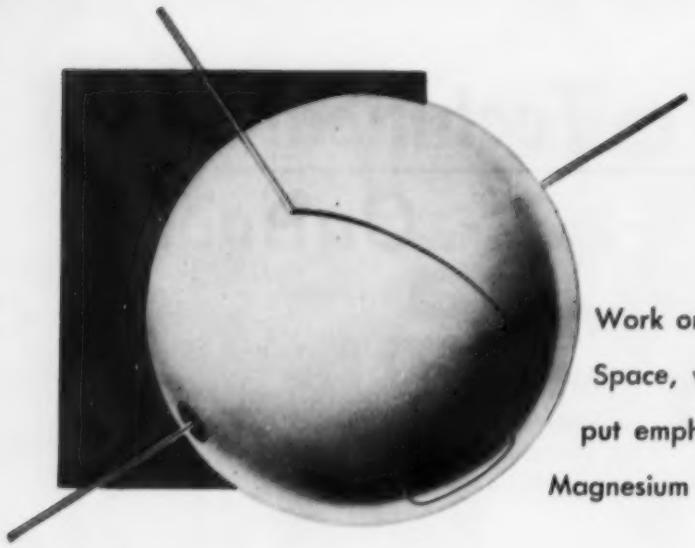
PROTECTS GRAPHITE— A molybdenum disilicide coating can be used to protect graphite against oxidation and abrasion. A report available from Office of Technical Services, Washington 25, D. C. tells how to apply it.

STRAIN GAGE BOND— An epoxy-rubber compound for bonding strain gages to metals and organic insulating materials is said to be virtually impervious to moisture. Called Epoxylite 222 (Epoxylite Corp., Montebello, Calif.), it is solventless and can be applied without heating parts.

MAGNESIUM FIRES— A 50 per cent solution of di-isodecyl phthalate or ethanol combined with chlorobromomethane is best for extinguishing magnesium fires, says an Air Force report.

MORE EXTRUSIONS— The only press in the U.S. Air Force Heavy Press program for extrusion of steels and large titanium parts is in operation at the Metals Processing Division of Curtis-Wright, Buffalo. A 50-ft long tube, 6 in. in diameter is extruded in 9 seconds.

Metalworking Outlook—p. 63 *Market Outlook—p. 161*



Work on the first man made moon is under way

Space, weight and reliability requirements put emphasis on precision and miniaturization. Magnesium and aluminum are key metals

Metalworking Tackles the Satellite

SOMETIME next year, man will stake his first claim on space.

A three-stage rocket will blast off from Florida's east coast. Its mission: To deliver a 21-lb magnesium "moon" to an altitude of 300 miles where it will cruise around the earth.

To most of us, such goings on are fantastic.

But to a handful of metalworking companies concentrating on Project Vanguard, they mean problems, sweat and dollars.

The Satellite—

The ball, which is only 20 in. across, weighs about 4 lb. Stuffed with instruments, it'll hit 21 lb.

Each half will be spun from a sheet of AZ31B alloy (Si 0.3, Mn 0.20, Al 2.5-3.5, Zn 0.6-1.4).

Brooks & Perkins Inc., Detroit, will deliver the first shell to the Naval Research Laboratory (it is heading up production and launching) in December. Techniques for the work at B&P are partially finalized. Spinning undoubtedly will be the first step in the production of the hemisphere. Stock will be preheated to about 700°F. Machining may be used to get the final shape.

Machining — Initial thickness of the sheet will be 0.051 to 0.064 in. The inside of the hemispheres will have to be finished. Machining will remove as much as 0.020 to 0.030 in. in some areas, leaving other sections thicker for reinforcement and for instrument mounting brackets. This may be done by milling.

The halves will be joined, and the outside will be contour machined and polished. Specifications call for about a 4 microinch finish to aid in detecting and tracking the satellite when it is aloft.

Brooks & Perkins also will furnish strengthening pieces, battery supports and built-in pressure chambers for inside the sphere. Some parts will be gold plated, probably because of gold's known reflectivity.

Instrumentation—Although B&P is working on only one sphere, about 15 will be built for initial tests. Instruments inside will depend on what is to be checked aloft. Plans are to shoot several (some say six) satellites eventually.

Instrumentation will be dictated by decisions of the National Academy of Sciences and developments of the Naval Research Laboratory. Instruments will be paragons of precision and miniaturization.

The ball also will carry transmitting and telemetering equipment to send information back to earth.

The Rockets—

Glenn L. Martin Co., Baltimore, has the prime contract for the aluminum-magnesium skinned launching vehicle—a three-stage rocket about 72 ft long, weighing nearly 11 tons.

The first stage will shoot the vehicle at 3000 to 4000 mph to a height of about 40 miles. Speed at first will be low enough to minimize temperature problems caused by friction-heat. As the atmosphere thins out, speed will increase. Only the first mile will be traveled vertically; after that, the ascent will gradually incline toward the horizontal.

As the first stage burns out and drops off, the second will kick in, boosting speed to about 11,000 mph. About 60 miles up, the pointed nose protecting the satellite through the densest part of the atmosphere will drop off, exposing the sphere. Experts calculate the second stage will burn out and drop off as it reaches an altitude of about 130 miles. The vehicle will coast the rest of the way.

At 300 miles, the third stage rocket will boost speed to 18,000 mph in a trajectory that should be horizontal. When it burns out, the satellite will coast at 18,000 mph, making a trip around the earth every 90 minutes.

Why the Satellite?

Behind the project that flirts with fantasy is a hard core of practical purpose. Proving that we can do it is part of the goal, but only a small part. More importantly, the satellite can observe for us from a heretofore impossible vantage point. Here are some things we may investigate:

- **Upper air densities, temperatures and pressures.**
- **Meteor dust frequency and effects.**
- **Ultraviolet, cosmic and x-ray radiation outside the atmosphere.**
- **Amount of hydrogen in space.**
- **Earth's reflection of sunlight.**
- **Ionization effects.**
- **Metal erosion.**
- **Earth's atmosphere.**
- **Earth's magnetic field.**
- **Causes and formation of weather cycles.**
- **New geodetic studies.**

In the future, satellites may be used as relay stations to enhance long-range communications. They may be an aid to navigation. Chrysler Corp., for example, has reported study on its "Astro" satellite for this purpose.

First Stage—The first stage will be a modified Viking rocket. It's to hold two, stressed-skin fuel tanks in which the liquid fuel and the oxidizer (liquid oxygen) are carried.

The rocket skin (aluminum) will form the tank walls. At each end of the tanks, an aluminum extrusion is welded to the rocket skin, and the domed headers are welded to the extrusion. The weld will have scalloped edges that provide a long weld and a stronger joint.

In the engine section, aft of the fuel tanks, aluminum frames and stringers will be riveted to a magnesium skin.

Master gages and optical tooling using the alignment collimator will govern dimensions of the tanks and engine compartment.

Drive — Martin has contracted with General Electric Co., Schenectady, N. Y., to build the liquid propellant rocket engine for the first stage. It will deliver 27,000 lb of thrust at sea level — two to three times more than today's best jet engines.

The engine will be attached to the rocket structure at four mounting points, and its thrust chamber will be gimbaled (swivel mounted) so the line of thrust can be varied to correct for pitch and yaw. The swiveling thrust chamber will be moved by hydraulic mechanisms that get directions from the control system.

Complex — The engine will include a turbine which will be driven by the decomposition products of hydrogen peroxide. The turbine will drive pumps that provide high pressure fuel and oxidizer injection.

It also will drive another pump to provide hydraulic pressure for the controls.

Exhaust products from the turbine will be used for roll control by swiveling the exhaust ports located outside the skin of the rocket.

Helium will pressurize the pro-

The first production model of Vanguard's master control system is shown to Rear Adm. Rawson Bennett, chief of naval research. Mounted in the second rocket stage, the system will keep the Vanguard on course. Richard Delp, aeronautical division armaments engineer, Minneapolis-Honeywell Regulator Co., holds the instrument. M-H built the control for prime-contractor Martin

This Minitrack transmitter will be mounted inside the satellite. Weighing only 13 ounces, the transmitter has enough battery power to last for two weeks. The circuit is single stage, crystal controlled and transistorized. Output is 10 milliwatts. The aluminum housing is gold plated to make it a better heat shield

Dr. John P. Hagan, director of Project Vanguard, draws a circle that approximates the satellite's orbit around the earth. On the table is the first full-scale model of the satellite

pellant tanks from which fuel and oxidizer will flow through pumps to the engine.

Forward of the main tanks, a riveted assembly of aluminum frames and magnesium skins will reduce the diameter of the first stage (45 in.) to the diameter of the second stage (32 in.).

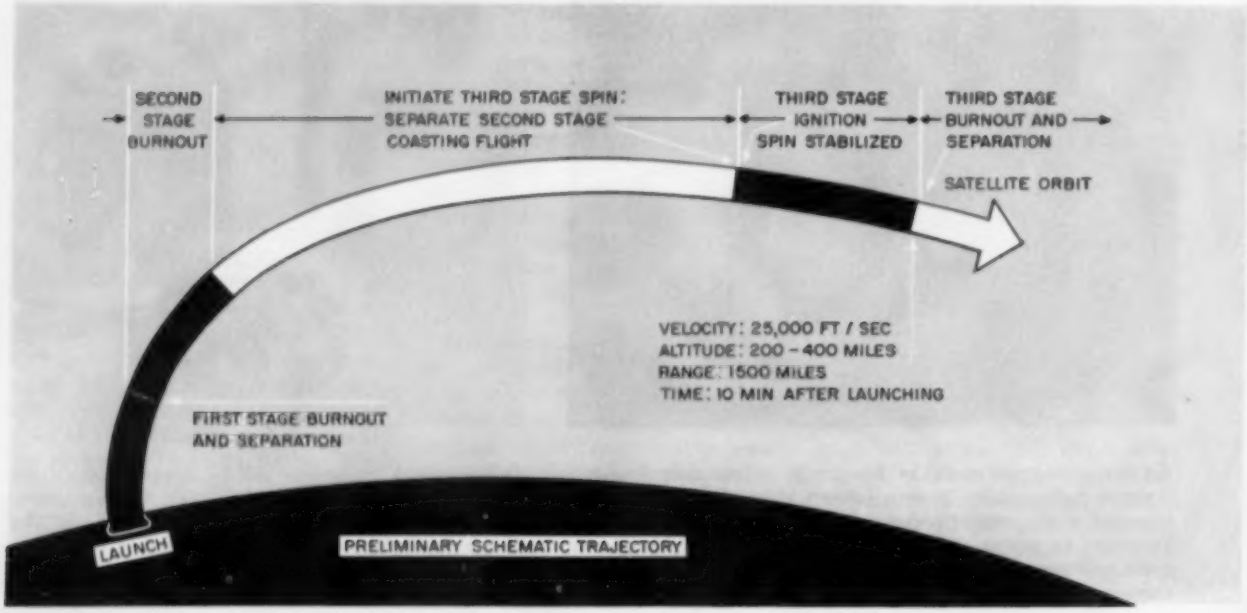
Second Stage—The after portion of the second stage, including the engine thrust chamber, tanks and plumbing, is being designed and built by Aerojet General Corp., Azusa, Calif. It will be delivered to Martin as a unit. Tanks will be 17-7 PH stainless steel because the fuel is corrosive.

The forward section will hold the master guidance system for the entire vehicle. It will also carry the third stage engine and the turntable on which the third stage, carrying the satellite, is mounted. This section will be aluminum and magnesium.

The Brains — The master guidance system will use a three-axis gyro reference system designed and built by Minneapolis-Honeywell Regulator Co., Minneapolis. The system will be entirely rocket-borne. Its job will be to keep the finless rocket from swerving off course because of sloshing fuel, air currents or other forces and to gradually tip the rocket's trajectory, so that it enters a globe-circling course at the desired altitude.

Three highly accurate gyroscopes will be calibrated to a memorized heading reference in the three axes or directions of flight—roll, pitch and yaw. Known as HIG (hermetic integrating gyros), they will have nearly 300 parts and require bearings that are alike within 10 millionths of an inch. Controls will signal the gimbaled thrust chambers to correct through a magnetic amplifier auto pilot. The pilot is being developed by Vickers Electric Division, Vickers Inc., St. Louis.

A timer and programmer will sequence the controls and engine operation, allowing the first and second stages to be jettisoned at predetermined times, so the planned trajectory will be achieved.


SECOND STAGE BURNOUT
INITIATE THIRD STAGE SPIN: SEPARATE SECOND STAGE COASTING FLIGHT
THIRD STAGE IGNITION SPIN STABILIZED
THIRD STAGE BURNOUT AND SEPARATION
SATELLITE ORBIT
VELOCITY: 25,000 FT / SEC
ALTITUDE: 200 - 400 MILES
RANGE: 1500 MILES
TIME: 10 MIN AFTER LAUNCHING
FIRST STAGE BURNOUT AND SEPARATION
LAUNCH
PRELIMINARY SCHEMATIC TRAJECTORY

Third Stage—This is a solid propellant rocket, a parallel development of Grand Central Rocket Co., Redland, Calif., and the Allegheny Ballistics Laboratory, Cumberland, Md.

This stage will have no guidance system, auto pilot or other means of control. It will be set on its course by the second stage at the end of its coasting flight.

By imparting a spinning motion to the third stage, the second stage will stabilize it for flight.

Arrival—When the third stage burns out, a spring or an explosive charge will nudge the satellite ahead. The empty cylinder also will become a satellite, following a different orbit. It also will be tracked.

Both the empty rocket and the satellite eventually will re-enter the earth's lower and denser atmosphere. Heat generated by their speed will burn them up.

Testing — The rocket structure will be subjected to normal static and dynamic load tests. Extreme environmental conditions encountered will be simulated.

After the fuel tanks are welded, they'll be pressure tested and calibrated. Helium and soap suds will be used to check for low-pressure leaks.

In the next test, tanks will be filled with water. Pressure will be increased, and if no leaks show up, the tanks will be emptied and the water weighed. Knowing the specific gravity of the fuel, engineers will use the weight of the water to figure the capacity of the tanks and the range of the two liquid-rocket stages.

Cleanliness — A detergent and water will be sprayed under pressure against all sides of the tanks. The spray nozzle will move up and down in the tank and also spin in the vertical and horizontal planes.

After the detergent is drained, the tanks will be rinsed and dried with forced hot air. The same nozzle will apply a chromodizing coating to all areas.

The tanks will be filled with helium under about 2 lb of pressure and sealed to prevent condensation and contamination while they await final assembly and filling.

The final test of the rocket will take place in a vertical (90-ft high) fixture with two positions that can test two rockets at once. First and second stages will be separated for ease of handling and sent to the firing site in truck trailers.

En Route — Frank M. Perkins, design specialist at Convair Division, General Dynamics Corp., San Diego, Calif., cites these developments as the chronology of man's march to interplanetary travel: 1. Unmanned satellite. 2. Manned orbital glider. 3. Permanent space station. 4. Space ships. 5. Interplanetary flight.

Stage No. 1 is almost here.

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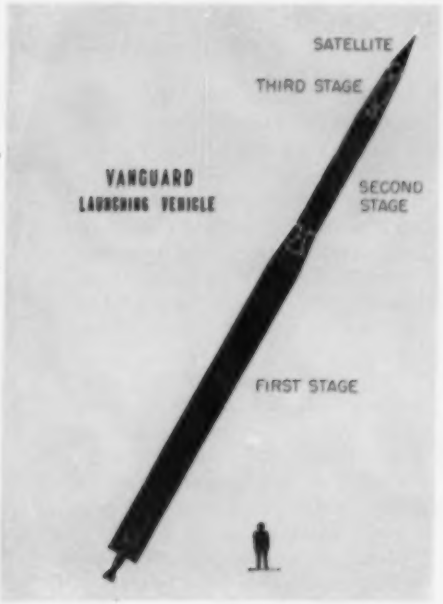
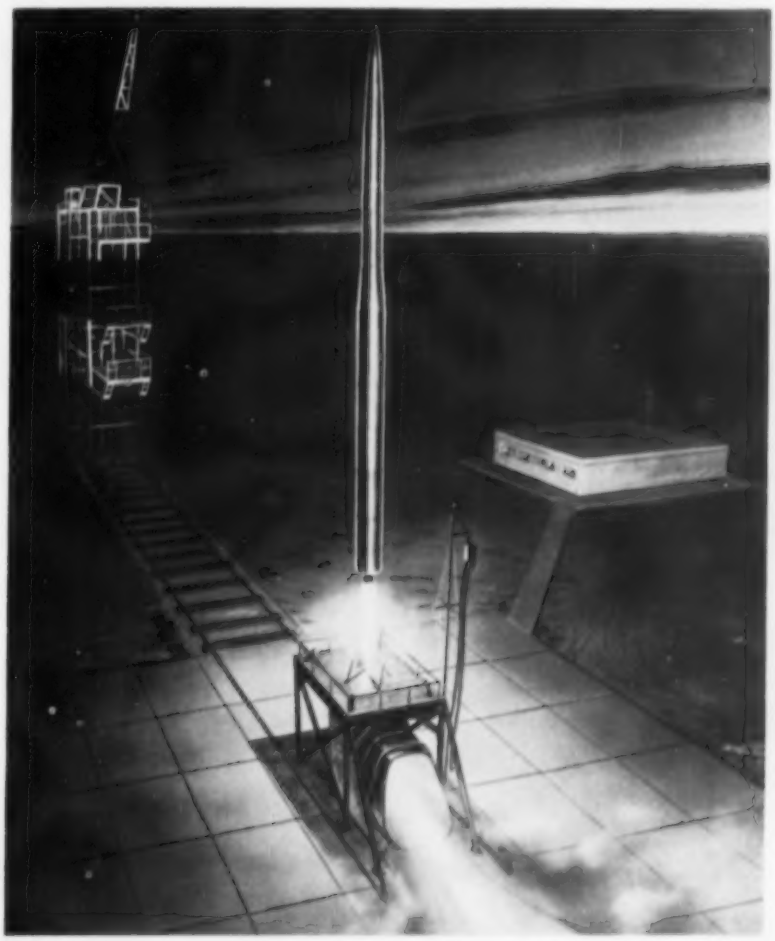




This artist's conception of the Vanguard launching station at Cocoa, Fla., shows the gantry (at rear) that hoists the rocket into its launching position. At the right is a concrete blockhouse where scientists will fire the rocket

1 Cut-to-size sheet is fed into the roll former (left). Shells are fed automatically into the submerged arc welder (right)

2 The head is welded to the shell. Welding head remains stationary; work revolves

Rheem Glass Lines Its Heaters

Submerged arc welders, steel shot blasters and better conveyors helped to solve this heater maker's problems. It takes 2½-hours from hot-rolled sheet to the finished product

IN 1940, a veteran in the water heater business, Rheem Mfg. Co., wanted to glass line its tanks. But pinholes in welds prevented the complete fusion of glass. Etching methods weren't economical. Poor material handling methods caused excessive damage.

These post-World War II improvements solves those problems:

Submerged arc welding produces sound welds without pinholes.

Steel shotblasting etches tanks economically.

Automated conveyors and transfer systems cut manual handling, nearly eliminating mechanical damage.

Rheem started production of glass lined tanks in Chicago about a year and a half ago. Today, almost identical lines are operating at Sparrows Point, Md., and South Gate, Calif.

Operation—In about 2½ hours a hot-rolled sheet is converted into a glass lined tank ready for its outside jacket. In that time, it travels about 1800 ft by conveyor.

Sheet is cut to size. A combination roll former and automatic welder completes the first operation. Welding speed is about 100 in. a minute.

To cut down the welding bead, the tank is placed in a special grinding machine. A cradle rocks it back and forth across a stationary wheel. Couplings and nipples are then welded to the shell. Hydraulic mandrels move into each end to form the flare which permits mounting the head and bottom pieces.

First Press—At this point, the heads, which have been pierced and formed on an auxiliary production line, are pressed and welded onto the tank. A hydraulic ram presses the head into position; the welder head remains stationary, and the welding is done as the tank unit revolves.

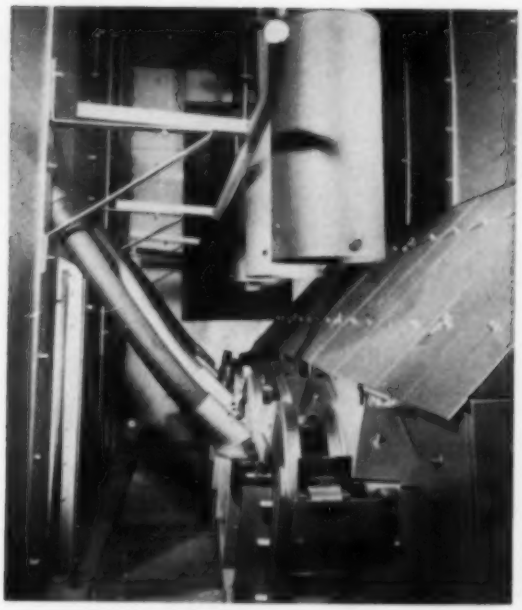
The tank now undergoes its first pressure test. The open bottom is automatically sealed by a hydraulically positioned pad on a machine which also applies air pressure to the tank. A soap solution applied to the welded seams shows up any leaks.

Flues and bottom pieces which have been welded under submerged arc at another station are next to enter the line. They're hung on the conveyor in alternate order with the tank shells.

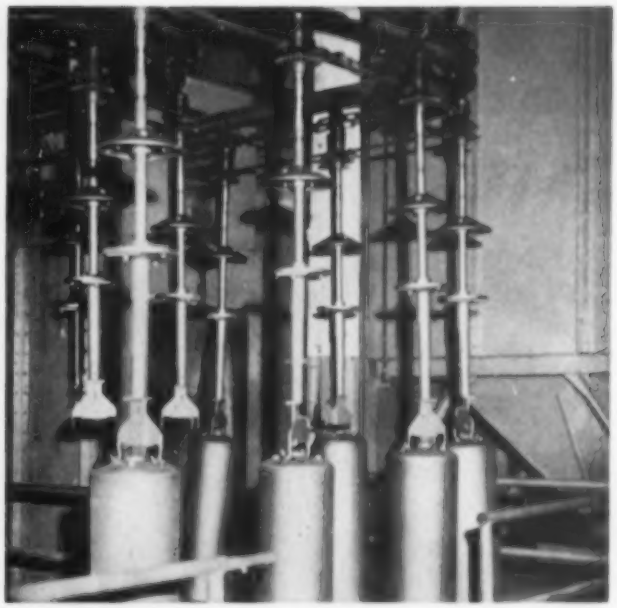
Shotblast—The first operation on the conveyor is cleaning. Components get a hot alkali spray, followed by a hot water rinse and drying.

Next stop is cleaning and etching in Wheelabrator booths. Tank shells move on a Monorail through four stations. At each one, tanks are steadied over a rotating wheel which blasts carbon steel grit onto selected areas inside the tank.

Flue and bottom assemblies are etched in another unit which is



3 Inside the Wheelabrator booth. Tanks are etched by each of the four wheels shown



4 Shells emerge from blasting. Conveyor carries them to spray booth and drying oven

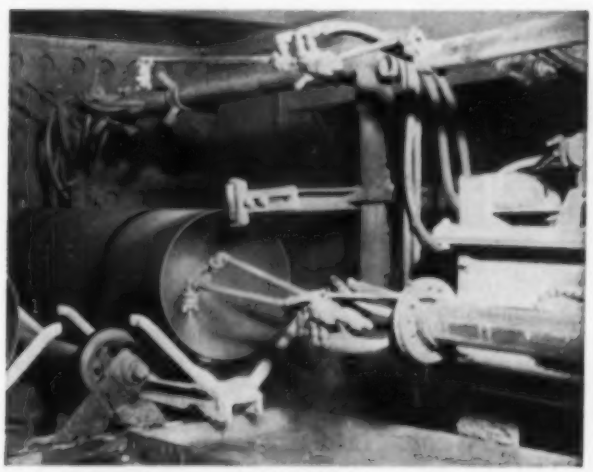
loaded and unloaded from one station on the conveyor line. Ready for glass coating, tank shells and flue-bottom units go down separate spraying lines.

Frit—In preparing the coating, Rheem buys frit and adds electrolyte so that it can be finely ground. Water is the suspension agent. It takes about 6 hours to do the grinding, using porcelain balls. Enamel is then aged in storage tanks. Constant agitation prevents settling.

Tanks are taken off the conveyor after the blasting and placed horizontally on another which carries them through the spraying booth and drying oven. Shells are sprayed two at a time and remain in the dryer about 15 minutes at 200 to 225°F.

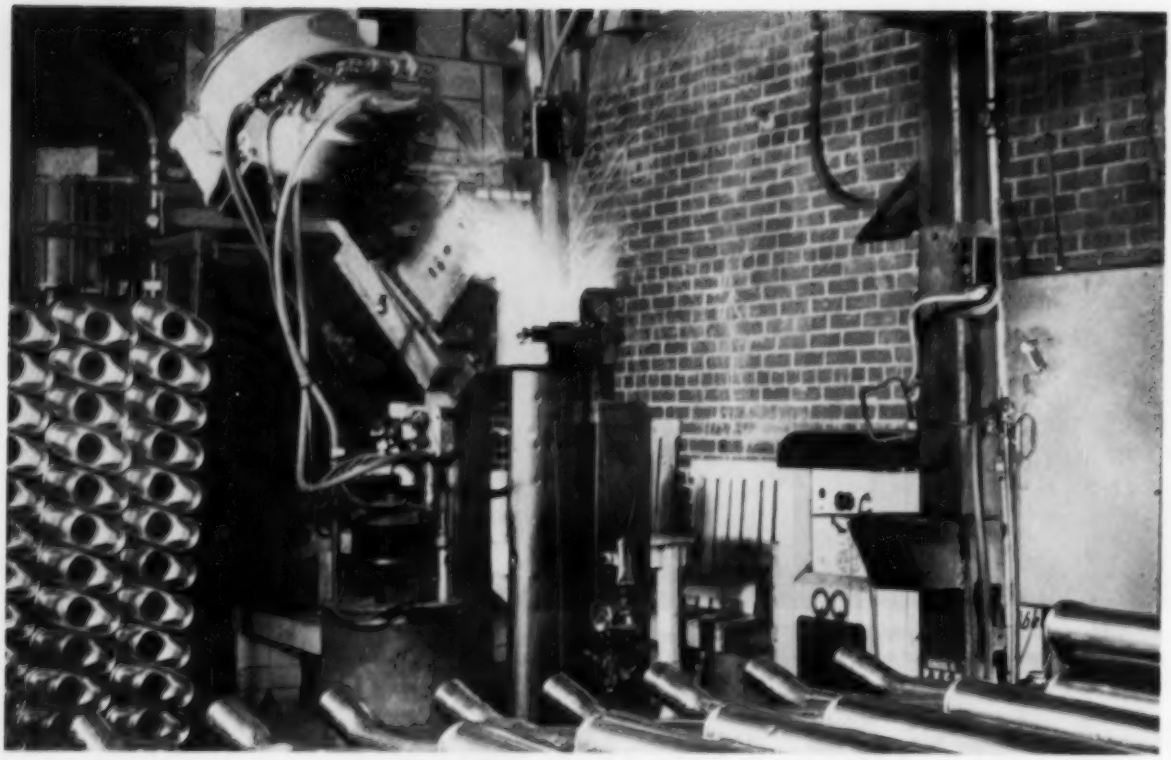
Heat—Rheem's firing furnace is a gas-fired U-type in which the temperature is approximately 1600°F. Firing time depends upon the gage of steel. A 12-gage tank, for example, takes about 45 minutes for the complete cycle—70 ft of travel in the preheat zone, 63 ft in the firing zone and 70 ft in the cooling chamber.

In the final operation, a hydraulic press assembles the bottom-flue unit to the tank shell. Welding is again done by submerged arc. The heat produced in the welding also fuses and joins the glass coatings of the bottom and shell units into a continuous surface.



5 Spray nozzles apply enameling frit. The outside gets a light coat to prevent formation of furnace scale

6 Shells and flues entering (left) and leaving (right) the U-type furnace. Welding fuses glass joints



This novel arrangement of welding equipment joins a 16 gage exhaust pipe to an 18 gage muffler. The work is stationary. Welding head, cooling system and gas cylinder revolve

Weld Faster with CO_2

You can join 18 and 16 gage mild steel sheet easier and faster with this shielded arc. Here is what a Detroit auto partmaker did to upgrade production and lower costs

Close-up of Aircomatic welding head and holding fixture for muffler assembly. CO_2 shielding here speeds production, cuts costs

THE auto exhaust muffler above is being welded to an automatic, CO_2 shielded arc welder. Said to be the first of its type in the Detroit area, it has lowered welding costs and increased production at the Walker-Michigan Division of Walker Mfg. Co., Detroit.

Switch—Design changes in the exhaust muffler assembly made it necessary to change fabrication methods. Walker-Michigan found that CO_2 worked well for single-pass welds on mild steel and produced parts more economically.

The fixture is novel: The work remains stationary while the Aircomatic welding gun, water cooling system and CO_2 cylinder revolve around the joint.

The muffler is made of two pieces of 18 gage, AISI 1008 mild steel, one of which is galvanized; the exhaust pipe is plain, 16 gage, AISI 1008.

Operation — The Detroit partmaker says that these are the most important rules when using CO_2 gas shielding:

1. It is vital to use gas with the highest purity.

2. The wire used must have enough manganese and silicon to overcome the oxidizing effects of the gas.

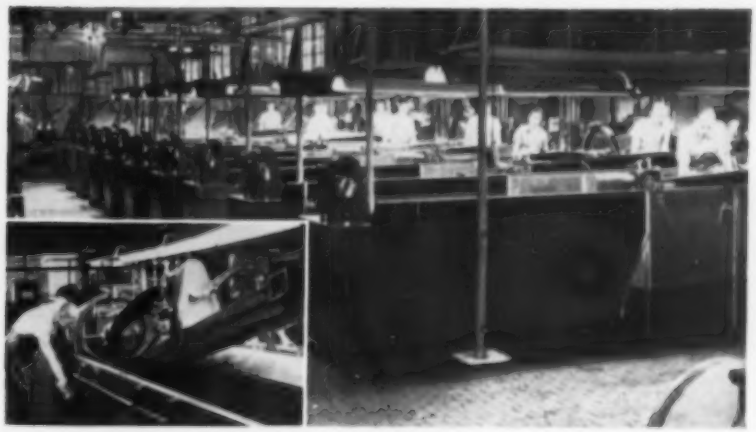
3. The fit-up must be as good or better than that needed for other types of welding. Fixtures must insure good alignment.

Here are the setup data:

Length of weld, 6¼-in.; time, 5 seconds; current, 250 amp direct current, reversed polarity; arc voltage, 27; wire, A 675, 0.045-in. in diameter; gas, 30 cfh CO_2; equipment, Model 21 Aircomatic, 50 amp CAV Bumblebee.

Case Studies:
NONDESTRUCTIVE TESTING SYSTEMS

AUTOMATIC AND HIGH SPEED MAGNAGLO UNIT inspects and processes steam turbine blades. By providing two-directional magnetization at the same time, it reveals cracks in any direction in a single "pass". An ideal method for lower cost, higher speed inspection needs.



Specially designed Magnaflux units tilt for inside-outside inspection of hollow steel propeller blades.

How Lower Production Costs Can Result From "Customized" Testing

Nobody expects to find defective propeller blades at 20,000 feet. Propeller manufacturers must, and do, discover even the tiniest flaws during manufacture and before their products ever leave the ground. A battery of specially designed Magnaflux units insures defect-free production at the Wright Aero Corp. New Jersey propeller plant.

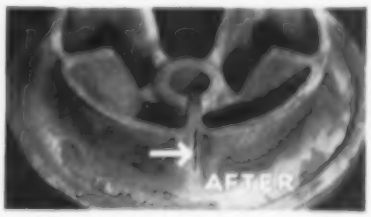
Of course, you don't make propeller blades. Whatever your product, you can use low cost standard test equipment—or tailor-made production test equipment TO MEET YOUR OWN NEED!

Magnaflux methods detect cracks, seams, porosity and other minute defects during the production process. By evaluating Ⓜ findings, the proper corrective steps are taken to eliminate early defects. Substantial savings result from increased production, doing away with further processing effort on faulty parts, and from reduced scrap losses.

If you're "up in the air" regarding defects in critical components, Magnaflux builds and sells nondestructive test equipment to meet your exact production-line or sample test needs. Or, if your operation requires only occasional reliable testing, why not investigate our Commercial Inspection Service, available on a low-cost basis in most major industrial communities?

For detailed information regarding either service, write today, or contact one of our nearby offices for a personal get-together with an experienced Magnaflux field engineer.

INSPECTING MAGNESIUM CASTINGS — Inspection, as such, cannot produce a better product. However, by translating Zyglo indications into corrective measures the foundry can produce castings which meet the needs of their customers. Zyglo fluorescent penetrant inspection detects such flaws as cold shuts, cracks, blows, shrinkage and dross in non-ferrous magnesium or aluminum castings.



HOW INVISIBLE FORCE DETECTS MECHANICAL DEFECTS

Ⓜ nondestructive testing is based upon simple magnetic principles. A part to be tested is first magnetized—then magnetic powders or fluorescent particles in oil are applied. Surface defects cause a break in the magnetic field—local magnetic poles cause particles to be held on part to mark extent of defect. Above—a Magnaflux indication on grey iron casting.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

Write for complete details concerning any of the above case studies, (excerpts from MAGNAFACTS), or ask for our new booklet on Lower Manufacturing Costs.

Take Your Inspection Problems to the House of Answers . . .

MAGNAFLUX CORPORATION

7312 W. Lawrence Avenue • Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11 • Dallas 19 • Los Angeles 58

"We in the steel industry are in the position of the pretty, young home town girl competing against the glamour girl of the big city. We can say to the young men: 'Look, we not only have everything those others have but we've got it here; we've got it now; we've had it a long time in the past; and we're going to have it a long time in the future.' But you know how immune to logical argument some young men can be . . ."
—C. L. AUSTIN

Inland Steel Corp.

Steel Challenges the Young

IN THE hurly-burly of career motivation and student recruiting, steelmakers for the most part have taken a back seat — and watched the college graduates go elsewhere. C. L. Austin, vice chairman of Jones & Laughlin Steel Corp., has taken his colleagues to task.

At the sixtieth anniversary dinner of the Wellman Engineering Co., Cleveland, Mr. Austin described the situation as it is and as it should be, and told how to get from one to the other. Said Mr. Austin:

Today, there are not enough technically trained men to go around. As an American I see this first as a national problem, but as a steelman, I feel it most painfully as a problem of my industry.

We are getting well-trained young engineers, but we are not getting them in the numbers we need. What is worse, we are not getting our share of those who do become available. The glamour industries — particularly atomic energy, electronics, aeronautics and petrochemicals — are absorbing a larger share of young engineers than we are.

Too Long—In the past, we have waited for the young man to come to us. Having joined us, he traveled the company, worked out his duty, learned more engineering, hopefully became inspired by his chief and rose slowly through the ranks. Whether we like it or not, we cannot get and hold young men on that kind of a program any more. Our well-staffed recruitment offices prove it.

In our relations with the college graduate, we are still living in the past. Long before he gets his diploma, we must try to get him to see the real glamour and romance in the making of steel. If the steel industry is to get its share of young people, we must search out the wrong notions they have about us and dispel them with facts.

Fable—A typical college graduate holds beliefs about the steel industry pretty much like these:

He thinks we are a slow-moving giant. Working for a giant, he feels, might be secure and safe, but he wants a company and an industry that are expanding rapidly.

He thinks we are primarily interested in metallurgical engineers.

He thinks we have not changed our processes since the days of Henry Bessemer and are not likely to change them much in the future. Since he thinks most of our problems are solved, he feels there is limited opportunity for new and creative work in our field.

He thinks we are hidebound and unimaginative in our attitudes toward the future.

None of these notions, of course, is true.

Fact—Steel is indeed a big industry which operates on a broad economic base. But steel is also, in every sense, a growth industry. It has increased its capacity 36 per cent in the last ten years, an average of 3½-per cent, or almost 3½-million tons, each year. The industry plans expansion and improvement programs for the next three years that will provide at least 15 million tons of additional steel capacity.

What about the young technical graduate's belief that the steel industry is interested chiefly in metallurgical engineers? Steel, of course, does offer good careers to metallurgical engineers — but we need and employ many other types of engineers and scientists. We need mining engineers and geologists, because we mine tremendous quantities of ore, coal and limestone. We need chemists, chemical engineers and physicists because we produce chemicals in our coke plants and because steelmaking is essentially a chemical process.

We need nuclear experts to study the long-range adaptation of atomic energy to our industry. We need electrical engineers because almost everything that

THE OTHER TURN

POOR SHORTY, HE REALLY BURNS WHEN WE TELL HIM, "BIG FELLOWS ON THE END, LITTLE ONES IN THE FRONT."
YEAH, I WONDER WHEN THAT NEW MAN'LL BE WELL ENOUGH TO COME BACK TO WORK, THE ONE THAT ASKED SHORTY WHY HE DIDN'T USE A BOX BACK THERE.
ONE OF THESE DAYS THAT ROD WILL STICK IN THE BANK AND SHORTY'LL BE HANGIN' UP THERE 'TIL IT BURNS OFF!
-D-!-?
MANY THANKS TO THE OPEN HEARTH CREW, EDGEWATER STEEL CO. OAKMONT, PA.
KUEKES

The Short Temper

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

ANNOUNCING THE

TO HELP YOU COMPARE a U. S. PowerGrip XX Heavy Duty "Timing" Belt drive with the four other common forms of power transmission of equal capacity, a power transmission engineer offers his recommendations based on published application and load ratings, for the following:

A 300-HP drive (at 1160 rpm.) including application factors. 3.00: 1 speed reduction. Approximately 50" center distance.

Here, complying with minimum pulley sizes and other practices commonly observed, are his recommendations (with approximate comparative cross sections of space occupied by each drive):

"TIMING" BELT DRIVE

Belt: XXH "Timing" Belt 10" wide by 160" P. L.

Motor Pulley: 9.549" P. D. (24-groove) 1¼"-pitch

Driven pulley: 28.648" P. D. (72-groove) 1¼"-pitch

Belt speed: 2900 feet per minute

V-BELT DRIVE

Belts: 10 Super Service "D"-Section V-Belts (DP-225)

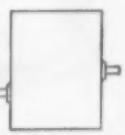
Motor pulley: 18.0" P. D. x 10-D-groove, 14¾" wide

Driven pulley: 54.0" P. D. x 10-groove, 14¾" wide

Belt speed: 5380 feet per minute

GEAR DRIVE

Herringbone gear speed reducer with 3.1 ratio. (A typical reducer of required capacity weighs 1440 lb., measures 33" long, 26⅝" high and 19" wide.)



ROLLER CHAIN DRIVE

Chain: #80-R (8 strands) 1"-pitch x 152 pitches

Motor sprocket: 7.979" P. D. (25 teeth)

Driven sprocket: 23.880" P. D. (75 teeth)

Chain speed: 2380 feet per minute

(Requires Type #3 lubrication with oil-tight case for sump pump)

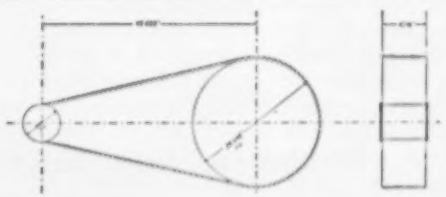
FLAT BELT DRIVE

Belt: 21" wide x 8-ply x 18' 4" long

Motor pulley: 18" O. D. x 23" wide

Driven pulley: 54" O. D. x 23" wide

Belt speed: 5380 feet per minute



Schematic of "Timing" Belt drive used for comparison above

Rubber cut away to show steel cables

THE "TIMING"® BELT DRIVE FOR HEAVY-DUTY MACHINERY

THIS LIFE-SIZE illustration only begins to suggest the brute strength built into this double extra-heavy-duty tooth-grip belt with steel-cable tension member *designed for drives up to 1000 hp.* Appearance doesn't tell the whole story, because, rating for rating, U. S. PowerGrip "Timing" Belt drives are lighter in weight and occupy less space* than any other form of mechanical power transmission.

Approximately 2½ times larger—and 2½ times stronger—than the standard "Heavy Duty" series, the new XX Heavy Duty drives bring to high-torque power transmission a never-before-obtainable combination of features:

- **Highest-efficiency positive transmission of power.**
- **Complete elimination of drive lubrication (including the problems and accessories involved).**
- **Precise angular synchronization ("Timing") between two or more shafts.**
- **Quiet operation.**
- **Practical elimination of power loss due to slippage, friction and high initial tension.**
- **Compactness and high strength-to-weight ratio.**
- **Belt speeds as high as 7500 fpm.**
- **Low initial cost; no maintenance; long life.**

A complete line of U. S. PowerGrip "Timing" Belts—plus expert engineering assistance—is available at any of the 28 "U.S." District Sales Offices, at selected "U.S." power transmission distributors, or by writing U. S. Rubber, Mechanical Goods Div., Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

*Including accessories required by some other drives.

US RUBBER

Mechanical Goods Division

United States Rubber

moves in our mills is powered by electricity.

And More—We need electronic engineers, because more and more we are using electronics to control our various production processes. We need mechanical engineers to improve our processes and industrial engineers to improve our methods. We need civil engineers to build and maintain our plants.

I understand there is a movement afoot to call accounting men "economic engineers." We need them, too, for scheduling; for budgeting; for measuring and controlling the financial, operating and sales phases of the business, and for handling the data processing equipment that is becoming more and more important in our business.

So much for steel as an industry that is alleged to be limited to metallurgists.

Slow Change—In a restricted sense, the principles of making and shaping steel are the same today as they were a half century ago. There are good reasons. The tremendous capital investment involved in building an integrated steel plant has discouraged quick change. The size and long life of a blast furnace, an open hearth shop or a battery of coke ovens have not permitted us the flexibility of expansion to be found in industries that work with smaller production units.

However, the long life span of our equipment requires the utmost ingenuity and foresight of engineering and technical minds to design and later modify our large installations.

Research — Steel is research minded today. Few industries are more eager to apply the skills of scientists and engineers to redesign and improve facilities, operation and products. In considering research, top steel management no longer asks "whether" but "how far can we go?" and "in what direction?"

This is but part of a larger change in the management and management-methods of steel companies. There has been a constant growth in all areas of management —personnel, labor relations, marketing, communication, technical development and operating controls and practices.

Breakthrough—We are on the verge of major technical breakthroughs that will revolutionize the making of steel. Perhaps most important is the development of direct reduction of iron ores to metallic iron.

Men have dreamed of this for more than a century. It can mean the elimination of some of our operations at the mines, of coke ovens and blast furnaces. It would mean simplification of a series of subsequent refining steps in open hearths or converters.

Samuel Wellman addressed himself to this problem in 1909, and engineered an electric furnace for the manufacture of steel directly from iron ore. His process turned out to be too expensive, and he adandoned it, but he proved it could be done. Other processes developed since that time have run aground on the same economic shoals. Now, we are near the goal economically and competitively.

Converter — A completely new way of mass producing quality steels is an accomplished breakthrough. Molten iron is refined into steel by the use of high-purity oxygen under high pressure, blown vertically from above against the surface of the metal bath.

We believe the process has definite economic advantages over conventional open-hearth steelmaking furnaces under some circumstances. We know that it produces good ductile steel that is ideal for cold rolling or drawing.

Extrusion—A third development, already accomplished, is a new process of shaping carbon steel by hot extrusion. It is more expensive than conventional forming methods for ordinary specifications and shapes, but it has already opened the door to new uses of steel in a wider range of products and for the elimination of much expensive machinery.

It is ideal for shapes that are especially complex, and for some bar sections that are ordered in quantities too small for economical rolling. Since the end product does not need to be machined, the method substantially reduces scrap metal.

A fourth recent development in commercial use on a relatively small scale is the continuous casting of billets and slabs from molten steel. This provides interesting possibilities for further development in the economical processing of steel products.

Another area in which we are breaking down barriers is the application of automation to the rolling of steel.

Ores—A sixth development of primary importance is the marked advance in our ability to beneficiate and agglomerate low-grade ores. As a result of this and of major discoveries of additional iron ore, we have no reason to fear a lack of iron ore for generations to come.

A seventh major technological development lies in new techniques in the operation of blast furnaces. For some years, we have not been getting the production we should have from our blast furnaces. We are now improving our productivity by a dynamic program for tailormaking the raw materials we put into the furnace. The program has been greatly advanced by the development of higher grade ore from the sintering and pelletizing of ore concentrates.

Quickly Old—These are some of the places where we are moving into advanced territory. They are new and exciting now; some day they will be routine.

Perhaps we tend to think of research and development too much in terms of entirely new processes, at the expense of solid accomplishments in less dramatic areas. A great field for advance in the steel business in the next ten years lies in developing better uses for what we have now — that is, making marginal improvements in existing facilities, equipment and methods.

The man who designs a better shear or slitter will help us measurably in our struggle to improve performance, reduce costs and remain competitive. I would give a great deal for the young genius who will some day produce for us an inexpensive steel that cannot rust — but I will settle now for one who will give us an even better temper mill, draw bench or annealing furnace.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Leave it to LEVINSON!

This you can be sure of . . . when Levinson takes your fabricating order your job will be delivered as specified and on time. This reputation for being on schedule plus top quality design, fabrication and erection is another reason why we say: "Leave it to Levinson." Warehousers, fabricators, designers of steel for over half a century.

the LEVINSON STEEL COMPANY

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Pittsburgh 3, Pa.
Phone HUbbard 1-1200

In 9 short years the Chambersburg CECO-DROP has become the standard gravity drop hammer of the forging industry. Some of the reasons for this astonishing success are these:

1. The Ceco-Drop is a proven tool, the original "Boardless Board Drop Hammer," with world wide acceptance.

2. More than 400 Ceco-Drops are in service in 119 forge shops all over the world. Many companies have initiated programs looking toward complete conversion to Ceco-Drops.

3. The Ceco-Drop has created new standards of performance, and established new standards of tolerance in drop forgings.

4. The Ceco-Drop minimizes leg fatigue in drop hammer operation. Hammermen prefer the Ceco-Drop.

5. The Ceco-Drop costs less to maintain, has fewer, more durable parts. Automatic lubrication prolongs parts life.

6. The Ceco-Drop is economical to operate. Air or steam is used only when the hammer is running.

7. The Ceco-Drop forges more minutes per hour. (Once it is set-up, just turn on the air or steam and forge.) It does more forging per blow, requires no board changes, no friction adjustment.

8. The Ceco-Drop is safer . . .The operator's station is clear. There are no overhead hazards. It has fewer, lighter mechanisms. It has a safety dog and safety cylinder cover. Power failure stops the hammer and clamps the ram.

9. The Ceco-Drop requires less die set-up time. Die changes are quicker, easier. It takes but a minute to adjust the stroke.

10. The Ceco-Drop has a wide range of operation due to the unique short stroke adjustment and control.

CECO-DROP

U. S. PATENT NO. 2,604,071, JULY, 1952 . . . OTHERS PENDING
CECO-DROPS HAVE BEEN BUILT IN SIZES FROM 500 LBS. TO 8000 LBS.

Builders of THE IMPACTER
"FORGING IN MID-AIR"

CHAMBERSBURG ENGINEERING CO. • CHAMBERSBURG, PENNA.

This is the 235-ton shell for the reactor vessel at America's first full-scale commercial nuclear power plant at Shippingport, Pa.

Fabricates Giant Reactor Vessel

It's three stories high, 9 ft in diameter and 6 to 8 in. thick. Engineers from five sources grappled with unique problems of forming, welding, machining and testing

IT takes more than a knowledge of nuclear physics to fabricate a 235-ton shell for a 100,000-kw reactor vessel.

That's what Combustion Engineering Inc., New York, learned when it tackled the problem of making a pressure vessel big enough to house two light trucks out of plates which were 6 to 10 in. thick. Engineers from five sources (Lukens Steel Co., Bethlehem Steel Co., Westinghouse Electric Corp., the Atomic Energy Commission and Combustion Engineering) pooled their efforts to solve problems like these:

1. Accepted stress formulas couldn't be used because of the unusual plate thickness.

2. Neutron and gamma ray flux from the nuclear fission process generates heat in the vessel wall. Its effect on the pressure and thermal stresses during start-up had to be calculated.

3. The immense weight of the components made turning and boring machines settle. Day to day temperature changes introduced variations outside acceptable tolerances.

Description—Here's what went into the vessel and how it was fabricated:

The vessel houses a radioactive core and some miscellaneous equipment which weigh about 100 tons. It is slightly larger than 9 ft in diameter (inside) and 31 ft long. One end is a removable hemisphere which is attached to the main body by 42 studs which are 6 in. in diameter. When in position, each stud is torqued to 40,000 psi. The head has 46 holes for handling fuel elements, instrument leads and control rods.

Neutron and gamma radiation, if not reduced at the vessel shell, could cause extremely high stresses. Thermal shields between the core and the shell reduce radiation to a safe level.

To cool the reactor, a number of nozzles which are 15 in. in diameter are placed near the top and at the bottom. Requirements call for 26 million lb of water each hour. Its temperature will be held between 507 and 542°F.

Twenty-four brackets about 3 ft below the center line of the outlet nozzles support the vessel which will weigh more than 385 tons installed.

Material—Because the primary coolant water is corrosive, the inside of the vessel is clad with ¼-in. stainless steel (AISI Type 304-L, 18 chromium, 8 nickel, 0.03 maximum carbon). The base metal is a manganese molybdenum steel (ASME SA-302, Grade B, Mn 1.10-1.50, Mo 0.40-0.60, C 0.27 maximum) with a minimum tensile strength of 80,000 psi.

The plates of this clad material were rolled by Lukens Steel Co., Coatesville, Pa.

Shop—Forming such large plates taxed the capacity of Combustion Engineering's Chattanooga, Tenn., plant. A new 80 x 360 ft bay was built to handle nuclear components. (A 175-ft extension is under construction.) It is equipped with a 250-ton crane, 62 ft above the floor; a 75-ton crane is used on a lower level.

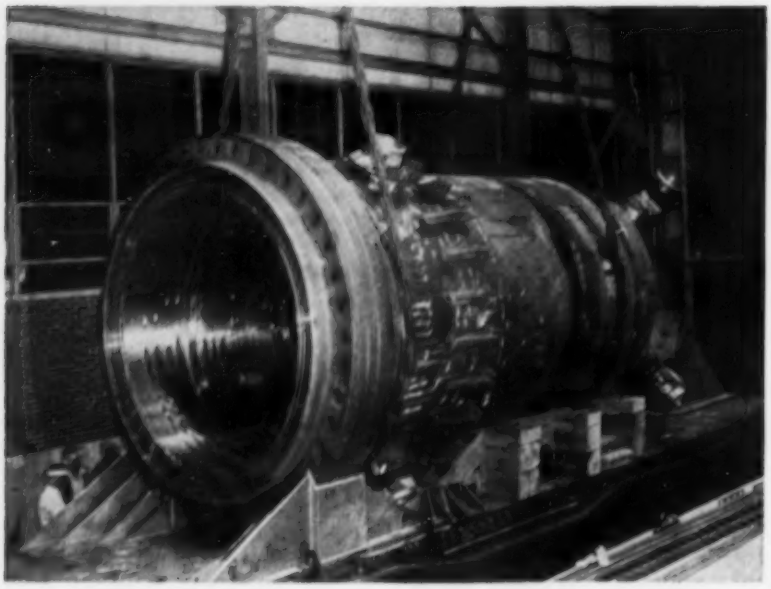
A 6000-ton hydraulic press was used to form the plates, which were heated to high temperatures during the forming. Both heads were made from orange-peel segments formed in a smaller, 2000-ton, four-post press.

A 250-ton furnace (gas-oil car type) was built to heat treat the vessels. It will handle parts up to 19 ft in diameter and 58 ft long. Temperatures can be maintained at 2150°F.

Immediately adjacent is a car-type sandblasting unit.

Machining—All final machining was done on one of the largest Gray horizontal boring and milling machines. It will bore, face, turn, mill or drill without requiring the movement of large workpieces.

The position of the work and the tool varied slightly from day to



Here is the shell on its 24-wheel flatcar. Flange (left) is forged manganese-molybdenum alloy, clad with a welded stainless overlay

REACTOR VESSEL . . .

day owing to the great weight and temperature variations. Standard methods of measurement weren't satisfactory, so optical ones were used. Measurements were possible while machining was in process.

Two ¼-scale models of the vessel were made and tested to verify stress levels. Readings from more than a thousand strain gages were noted while the vessel was stressed internally and externally.

A test vessel of the same diameter is being tested to further substantiate design calculations. The smaller vessels will be put through heat cycles to establish rates of start-up and shutdown and to see how they will react.

Testing—Because atomic reactors aren't as accessible as ordinary power plants for repair work, extraordinary testing methods had to be used to insure perfect or near-perfect performance.

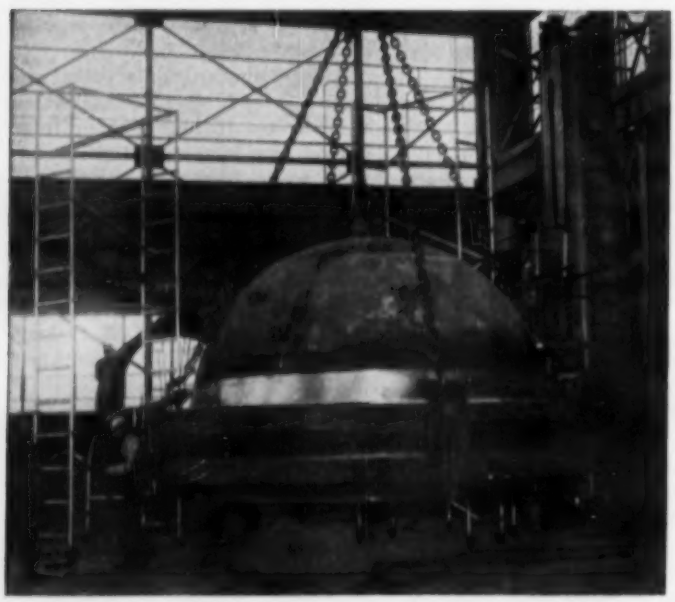
The bond between the cladding and the base metal had to meet the shear test requirements of ASME Specification SA-264. The continuity of the bond was tested by an ultrasonic reflectoscope and a dye penetrant fluid. Ultrasonic and magnetic particle inspection were used to test the base metal.

All welds were radiographed with a 15-million-volt Betatron. It can detect flaws or defects as small as a ⅛-in. piece of toothpick in a plate 10 in. thick.

Shipping — Joseph V. Santry, chairman of Combustion Engineering, says: "Close planning and co-ordination were essential because of pressure for delivery. Many operations were carried on seven days a week, 24 hours a day."

It was originally planned to send the vessel by barge, but the floating cranes in the Pittsburgh area weren't large enough to handle the weight. It was sent by rail on a special flat car.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.



This 85-ton head is about to get 46 openings for fuel handling equipment, instrument leads and control rods

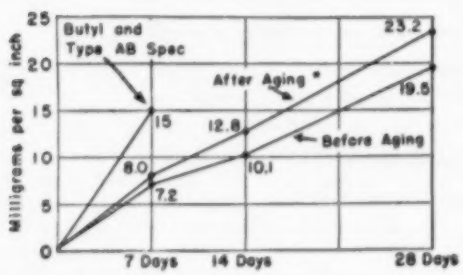
It takes 42 of these studs to hold hemispherical end to main vessel. Each one weighs 700 lb

Amazing moisture resistance of Anaconda's Type AB butyl high-voltage insulation helps reduce failure due to moisture.

When you can't keep cable out of moisture

New insulation keeps moisture out of cable

Exceptional moisture resistance is provided by Anaconda Type AB butyl insulation.



RESULTS OF mechanical moisture absorption test show Type AB retains good moisture resistance even after aging.

Where rubber-type cable is installed in underground ducts or buried directly in the earth, the moisture-resistance properties of the *insulation* are vitally important.

Latest facts show *Anaconda's Type AB butyl high-voltage insulation absorbs far less moisture* than industry standards permit. For the mechanical moisture absorption test, the industry has regarded 15 milligrams increase in weight per square inch of exposed surface, after 7 days' immersion at 70C, as a criterion for satisfactory moisture resistance. Type AB easily meets that requirement – in fact, typical results show it absorbs less than 7.2 mg. in 7 days.

New Engineering Bulletin EB-27 gives you full details on performance of Type AB insulation in 15 Industry Specification tests. Ask the Man from Anaconda for your copy. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

Get all the facts on Anaconda butyl. Write today –

ASK THE MAN FROM ANACONDA®

–PIONEER IN BUTYL INSULATION

Steelmasters for 130 years

IRON PRODUCTS
"Swede" Pig Iron

STEEL PRODUCTS
Plates (sheared)
A. W. Dynalloy (high strength steel)
Hot Rolled Sheets
Hot Rolled Strip
Cold Rolled Sheets
Cold Rolled Strip

ROLLED STEEL FLOOR PLATE
A. W. Algrip abrasive
A. W. Super-Diamond pattern

A. W. CUT NAILS
Standard & Hardened

MINE PRODUCTS
Iron Ore Concentrates
Iron Powder
Crushed Stone
Grit
Sand & Engine Sand

COKE
Foundry, Industrial & Metallurgical

COAL CHEMICALS
Ammonium Sulphate
Benzol
Toluol
Xylol
Naphthalene
Sodium Phenolate
Tar Bases (Pyridene)
Solvent Naphtha
Crude Still Residue

PENCO METAL PRODUCTS DIVISION
Steel Cabinets
Lockers & Shelving

INTEGRATION . . .

Alan Wood's integration means positive quality control from the selection of the ores to product delivery. Ores from our own mines at Dover and Oxford, New Jersey—iron from our blast furnace at Swedeland, Pa.—steel from our open hearth and mills at Ivy Rock, Pa.—constantly inspected by our laboratories, ensures compliance with customer requirements.

For detailed information on Alan Wood and its products, write Marketing Division—Department AW-51.

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

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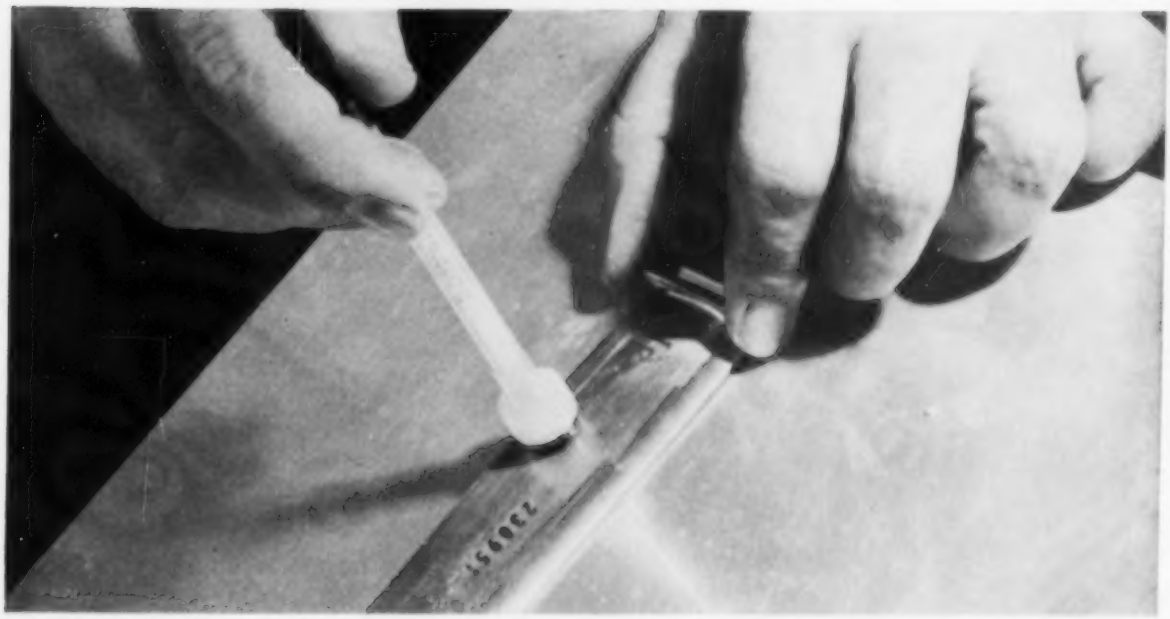


Titanium blades can't be marked with a die. The number was made with a rectangular hand stencil. Electromark pencil is being used to mark inspector's O.K.

Electrolytic Marking: It's Versatile

A chemical fluid and a safe electric current make a metal-marking combination that's hard to beat. It won't damage plating or finely machined surfaces

PERMANENT marking of highly finished surfaces isn't a problem when you use electrolysis. It's a solution with a different approach: Metal surfaces are plated or impregnated with permanent, non-corrosive oxides.

The equipment (Electromark Corp., Cleveland) is simple: 1. A power source of 10 volt-amperes (alternating or direct current). 2. An electrode made of stainless steel screen. 3. A felt pad. 4. A stencil.

Style—There are three ways to use the system. Each produces a distinctive mark through a stencil which covers the felt pad in the electrode.

The plated type of mark is made with a direct current source. Just connect the work to the negative pole, the electrode to the positive, and dip the pad into an electrolytic solution. Pressing the electrode lightly on the work leaves the mark that is in the stencil.

The etched type is made by changing the electrolytic solution; it doesn't matter which poles you select for the electrode or the work. Some chemicals give the mark a matte appearance.

More Common—Alternating current is generally used for ferrous metals. The mark is black.

If you analyze the mark, you'll find it's made entirely of stable ferrous oxides. The electrolyte is important because it's possible to introduce incompatible metals which cause galvanic action and corrosion. The salts of cobalt are ideal.

In all methods, the etching stops when the electrical circuit is broken.

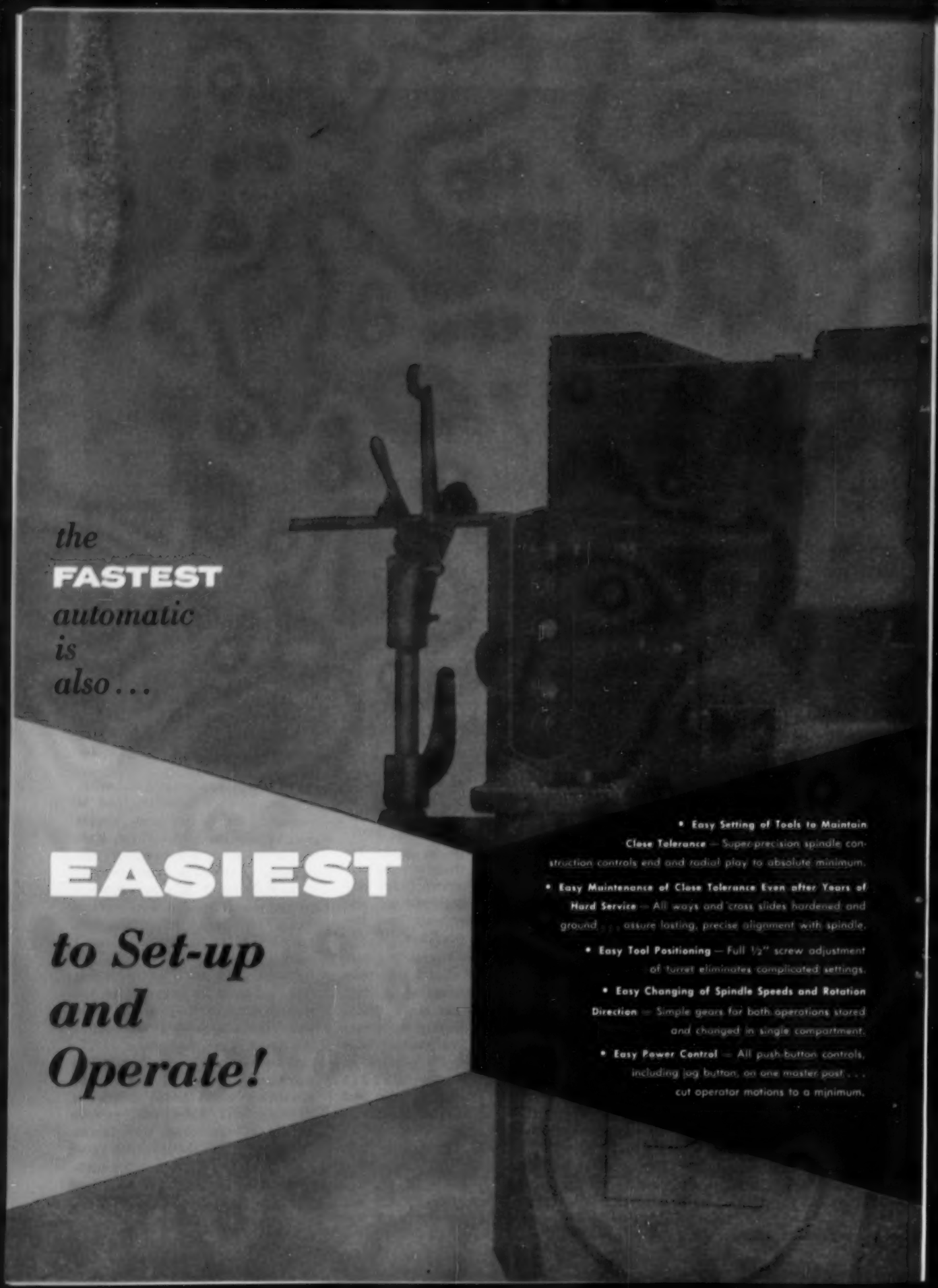
Stencils—Exceptionally fine and intricate designs are possible if you use a good stencil. Its primary purpose is to act as a water tight mask during electrolytic action.

Two types are most successful. One is pressure sensitive and is limited to fairly fine lines, simple designs and small quantities. Easily prepared on a typewriter, the pressure of the type faces displace the soft coating, leaving openings for the electrolyte. A mimeograph stencil is a good substitute, but don't try a silk screen: It doesn't work.

The second is a photographic type and must be prepared by the manufacturer. It lasts a long time, and there is apparently no limit to the detail it can reproduce.

Housekeeping — Electrolytic marking is safe and clean. The chemicals won't stain hands or clothing and none will corrode metals. There are no toxic fumes.

Markings are durable and resist heat treatments and pickling acids. Sometimes you can see them through platings.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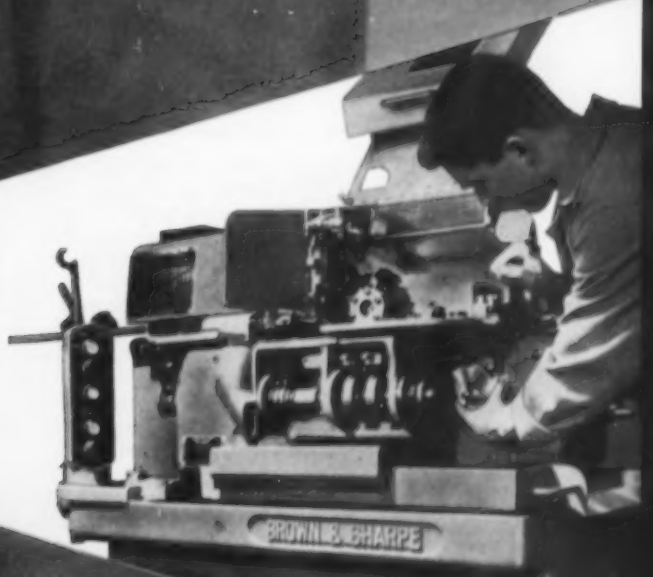
EASIEST
to Set-up
and
Operate!
• **Easy Setting of Tools to Maintain Close Tolerance** — Super-precision spindle construction controls end and radial play to absolute minimum.
• **Easy Maintenance of Close Tolerance Even after Years of Hard Service** — All ways and cross slides hardened and ground . . . assure lasting, precise alignment with spindle.
• **Easy Tool Positioning** — Full ½" screw adjustment of turret eliminates complicated settings.
• **Easy Changing of Spindle Speeds and Rotation Direction** — Simple gears for both operations stored and changed in single compartment.
• **Easy Power Control** — All push-button controls, including jog button, on one master post . . . cut operator motions to a minimum.

Brown & Sharpe
No. 00 Automatic
Screw Machine

That's right! The fastest automatic on the market also holds the record for ease of set-up and operation! In fact, the Brown & Sharpe No. 00 Automatic Screw Machine provides a unique combination of high speed, easy operation, and low maintenance that steps up overall efficiency as much as 33⅓%! Push-button controlled, modern in every detail, it's the truly advanced automatic for turning, forming, one-chip finishing to 0.0005". Only a few of its time-saving features are listed on these pages. Write for full details. Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.



Ask about Our Pay-as-You-Depreciate Machine Tool Plan

Brown & Sharpe MBS

Research at Westinghouse . . .

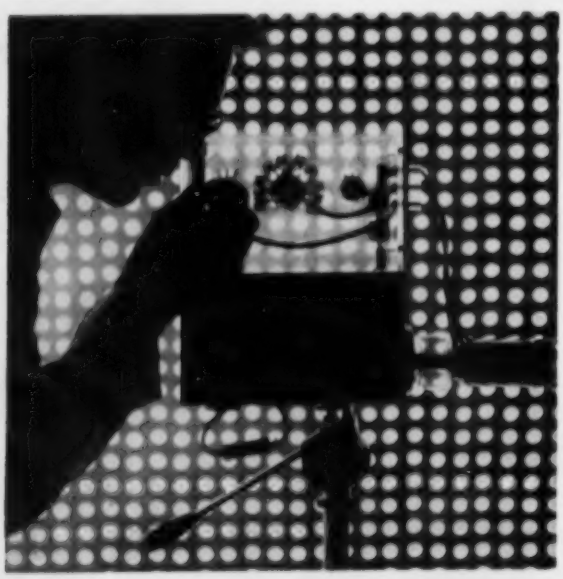
Goes in Many Directions

Only 10 per cent of the work at Westinghouse's Research Laboratory, dedicated on Sept. 20, is on applied research. Says Gwilym A. Price, chairman and president: "About 50 per cent goes for basic research that relates directly to our business and 40 per cent ($2.5 million this year) on fundamental research basic to the electrical industry but on projects which have little or nothing to do with our business as such." Here is a cross section of the program

Supercritical Steam Will Run Turbine

A turbine being built by Westinghouse's Steam Division will operate at an input steam pressure of 5000 psi—double that of present turbines in electric utility service. Steam temperature will be 1200°F—so high that the parts which contain it will glow red. The increase in efficiency will make possible the production of a kilowatt-hour of electricity from less fuel than ever before.

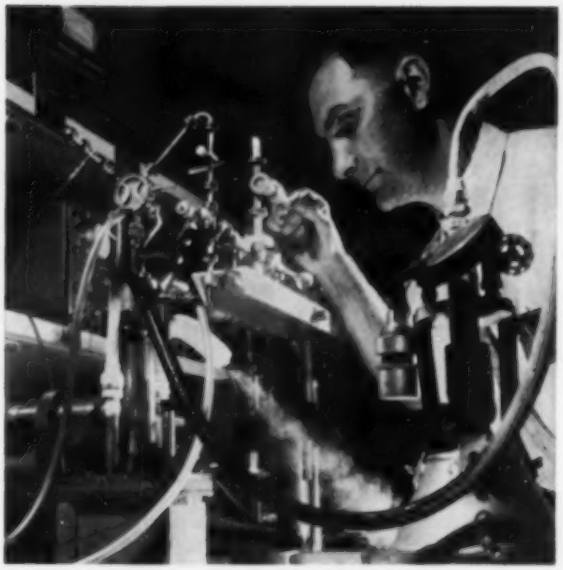
Research on the mechanical properties of metals to be used (right) have a top spot in the Mechanics Department at the research laboratory. Supercritical steam is used in testing machines to evaluate materials for the new turbine.



Tube Sees in the Dark

The test pattern background (left) silhouettes the Ebicon, a new type television tube. It operates on the principle of electron multiplication and promises to be 100 times more sensitive than the standard tube used in television cameras.

Why do we want to see in the dark? Westinghouse scientists explain that there are a number of reasons for wanting to push visibility limit as far as possible: 1. Military—to place enemy troops and movements under closer surveillance during darkness. 2. Medical—to improve x-ray fluoroscopic techniques. 3. Astronomy—to see great distances into space. 4. Atomic energy—to record the results of high energy atomic reactions as they take place inside luminescent crystals. Other uses include color and black-and-white television and closed circuit telecasts inside plants where lighting is limited.

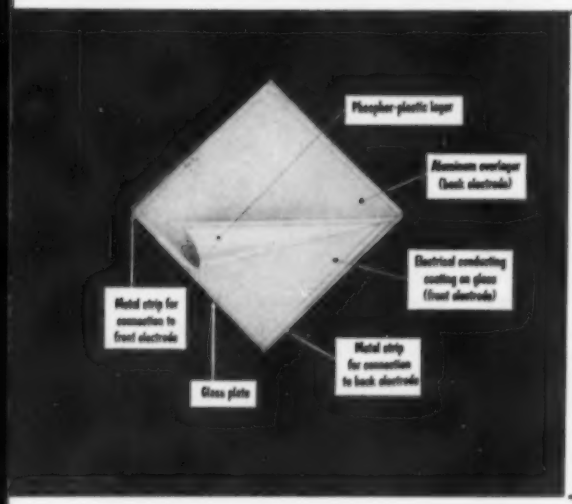


Superconductivity of Metals

Electric currents appear to flow forever in certain metals (called superconductors) at extremely low temperatures. Contrast this with a ring of the purest copper where an electric current dies out in about 1 second after it's started.

Westinghouse research physicists use superfrequency waves to bombard a superconducting metal, such as aluminum or tin, that is held at a temperature of less than 1 degree above absolute zero—about minus 459°F. The waves are absorbed by the metal, which "soaks up" enough energy to lift its electrons from the superconducting to the normal conducting state. Measurements are made of the energy required for different temperatures of the metal.

Some metals, such as lead and tin, which are only fair conductors at ordinary temperatures, become perfect conductors a few degrees above absolute zero. Studies on the "why" of superconductivity will lead to better cables for long distance communication.


Phosphor-plastic layer
Aluminum overlayer (back electrode)
Electrical conducting coating on glass (front electrode)
Metal strip for connection to front electrode
Metal strip for connection to back electrode
Glass plate

Light Source of Tomorrow

The panel at left gives off electronic light. Known as an electroluminescent cell, it is made like a sandwich in which a phosphor is placed between two conducting plates like those of a condenser. When proper voltage is applied, the phosphor lights up. Brightness can be varied and different colors produced by the changing voltage and frequency on the cell.

Researchers in Westinghouse's Lamp Division say there are no theoretical reasons why an efficiency equal to four times that of present fluorescent lamps cannot be reached when electroluminescent cells are perfected. Savings in power consumption for lighting will be tremendous.

Quench for Electric Arcs

Using steel balls to simulate electrons, this Westinghouse scientist demonstrates the ability of sulphur hexafluoride gas to quench an electric arc. Right section of model represents air; left one, the new gas. When the electron (ball) is released on the right, it triggers an avalanche of electrons—considered the electric arc. On the left side, the avalanche never begins because of holes which capture the balls.

Certain types of gases (such as sulphur hexafluoride) offer great promise in quenching electric arcs. Because they can capture electrons—the negatively charged bodies which help make up electric arcs—they kill the arc. Such gases are called electronegative because their molecules will attach themselves to an electron. They literally soak up the arc's electrons as a sponge soaks up water. The electron-sponge process will be used to make better circuit breakers.

New Heat Resistant Insulation

The class "A" conventionally insulated transformer (below) weighs 9 lb. It can be trimmed to 4½-lb using a solventless silicone insulation developed jointly by Westinghouse and Dow Corning Corp. scientists.

Reasons: Wire of smaller diameter can be used in the transformer. Smaller iron cores can be used. The insulation can take the extra heat generated by the smaller parts.

Solventless silicones are low viscosity, fluid resins. They can be used to form thick sections of solid insulation, which is heat resistant and bubble free, for complex electrical equipment. Because of their low viscosity, these silicones completely fill all voids between conductors. They get their thermal stability from a close molecular relationship to sand. They can operate continuously for thousands of hours at about 500°F.

Many applications are seen: Impregnation of electronic components for aircraft and missiles, high voltage transformers, generator and motor insulations of greater thermal stability and improved reliability. Its most important use stems from a benefit: The size of equipment using it can be reduced, making it a natural for aircraft.

Molybdenum Cladding for High Heat

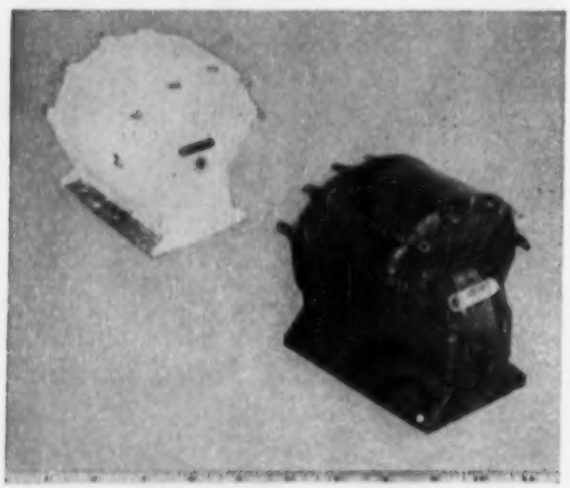
Full scale tests will soon start on a new combination of high temperature alloys that may increase the efficiency of jet engines more than 15 per cent. The development, worked out by Westinghouse research metallurgists, clads molybdenum with Inconel.

Present high temperature alloys restrict maximum turbine inlet temperatures to about 1600°F. With Inconel-clad molybdenum temperatures of 1800 to 1900°F can be used. Jet engine and gas turbine efficiency increases almost in direct proportion with increases in temperature. Some of the most recent molybdenum alloys, such as those containing about 0.5 per cent zirconium, are much stronger than the pure metal at high temperatures.

Application tests are being conducted at the Westinghouse Aviation Gas Turbine Division, Kansas City, Mo., with "clad moly" used for turbine blades and afterburner parts.

When Inconel is rolled on molybdenum at high temperatures, a layer of hard, brittle material forms between the two alloys. This makes the cladding alloy tear away easily. Metallurgists working on the job found that this intermetallic compound could be eliminated by placing a barrier metal, such as palladium, between the two alloys.

Photo below shows a test used at the Research Laboratory to demonstrate the strength of the new alloy combination. Heat is applied to three specimens under high stress. Inconel breaks when the temperature reaches 1350 to 1450°F. Molybdenum does not break at 1850°F but starts to smoke at about 1300°F. This is due to oxidation which rapidly burns up the metal. When heat is applied to "clad moly," the specimen neither burns nor breaks at 1850 to 1950°F because of the oxidation resistance of the outer layer of Inconel and the strength of the molybdenum. Westinghouse people say it's "by far the strongest material developed for temperatures above 1600°F."



300 one-ton precision forgings? Standard Steel makes them—fast!

Whatever your requirements are for forgings, large or small, we can make them to strictest specifications—and make them fast.

On a recent job for R. Hoe and Company, Inc., of New York, we made 300 one-ton cylinder forgings for printing presses. They were delivered on schedule, and measured up completely to the rigid specifications required for precision printing presses.

Hoe has standardized on Standard Steel cylinder forgings because:

- Cylinders are forged close to final tolerances, so expensive machining time is greatly reduced.
- Uniform grain structure of forged steel cylinders provides strength to hold the frequently-changed printing plates on the fast-revolving cylinders.
- Dimensional stability of forged steel cylinders assures that press operation will not be jeopardized by metal distortion.

Standard Steel Works can also furnish you with shafts, wheels, gear blanks, rings, flanges and special shapes. Next time you need forgings of any kind, and need them on time, get our quotation first. For your copy of bulletin 10,000, write Dept. 9346, Standard Steel Works Division, BLH Corporation, Burnham, Penna.

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STAMCO, Inc., New Bremen, Ohio

Cylindrical Grinding Machine Handles Work 30-In. in Diameter

The LCTU is a semiautomatic grinder that comes in 48, 72 and 96 in. work lengths.

Wide tables and ways are built into the machine to provide rugged support to the work. The machine does precision grinding of large, relatively light workpieces.

Automatic or manual feed settings are speeded by a "click-count" wheel feed index. Feed increments as fine as 0.0001 in. are set without visual attention.

Wheel spindles run in long, full bearings that are pressure lubricated.

A rotating screw-type automatic wheel feed mechanism gives repetitive accuracy.

A single lever starts the automatic cycle. It can be ended manually, or by an electrically timed control.

A jogging lever rotates the work to the most convenient position for loading or inspection.

The preset table-truing and grinding-speed control maintains separate table speeds for truing and grinding, as set from the first workpiece.

Also new is a line of heavy duty cylindrical grinders that handle workpieces weighing up to 6500 lb on centers. *Write*: Norton Co., Worcester 6, Mass. *Phone*: Pleasant 2-4641

Pushbottom Control Switch Is Dust, Oil and Watertight

This heavy duty switch is rated at 600 volts ac or dc. It is designed for a wide range of applications in the original equipment and replacement markets.

The switch mounts in holes 1 13/64-in. in diameter on standard panel mounting centers. Panel thickness can be 1/16 to 1/4-in.

Switches come in both flush-plate and box-type mountings to make any combination of individual pushbutton, selector or pilot light assemblies.

Box covers and flush plates are provided with captive screws to speed installation and easy-to-read legend plates which lock into position.

Single and double pole contact blocks can be used interchangeably with the several types of pushbutton and selector operator heads.

There is ample space for secure wiring or use of stake-on lugs.

Terminal screws permanently secure wires for troublefree service. Brass inserts, molded into the contact block, secure stationary contacts and provide maximum thread support for terminal screws.

Merely changing a collar (there are three different heights) converts a flush button to an extended type.

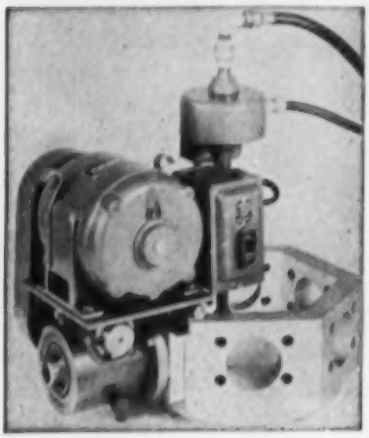
The buttons come in an assortment of colors to conform with standard codes and are made of a nonfading, glass-filled polyester resin.

Plastic shields enclose large silver alloy contacts. The main contact block is unit-molded to assure perfect alignment and simplify assembly. *Write*: Electrical Mfg. Division, National Acme Co., 170 E. 131st St., Cleveland 8, O. *Phone*: Glenville 1-9080

NEW PRODUCTS and equipment

Drill Speeders

Models 150 and 150B are attachments for large turret lathes. Model 150 is for holes up to 1 in., Model 150B for holes up to 1¾-in.



Swivel connections for both power and coolant are provided so that full indexing of the turret is not impaired.

Model 150 has a speed range of 120, 240 and 480 rpm. Speeds of 150B are 30, 60 and 120 rpm. *Write*: E. F. Vilter Co., 4161 N. Richards St., Milwaukee 12, Wis. *Phone*: Edgewood 2-7810

Welders

This line includes 300, 500, 750 and 1200-amp machines. They are the modified constant voltage type.

Adjustable slope control gives a soft arc, eliminates burn-back and stubbing and provides a stable, spray-type deposit when properly adjusted for aluminum, stainless steel and other alloys.

The possibility of erratic welds due to high current surges is eliminated. *Write*: Welding Division, Harnischfeger Corp., Milwaukee 1, Wis. *Phone*: Orchard 1-4400

Gravity Conveyor

Number 220 is a portable roller unit for plants, trucks, freight cars or shipping platforms.

The conveyor comes in 10 ft lengths and 10 to 24 in. widths. The 2-in. rollers have a capacity of 175 lb. *Write*: Harry J. Ferguson Co., West Ave., Jenkintown, Pa.

Fork Lift Truck

Model R10T is an electric powered truck with a capacity of 10,000 lb. It has front wheel drive, rear wheel steer and a speed of 4 mph loaded (4½-mph unloaded).

The truck has four speeds. A single handlever controls acceleration and direction. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

Spot Welder

The SX is a single phase machine that can do multiple spot-welding of deep drawn sections.

The electric resistance unit consists of a universal multiple gun base with two separate platen units.

Platen units operate independently and load in an extended position. They swing in and lift to the welding position. After the welding sequence is completed they retract and swing out for unloading.

To the standard base unit you can attach special superstructures

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Atlanta	WLWA	11
Baltimore	WAAM	13
Bloomington, Ill.	WBLN-TV	15
Buffalo	WGR-TV	2
Burlington	WCAX-TV	3
Cedar Rapids	KCRG-TV	9
Chicago	WBKB	7
Cincinnati	WCPO-TV	9
Cleveland	WEWS	5
Columbus, O.	WTVN-TV	6
Dallas-Ft. Worth	WBAP-TV	5
Danville, Ill.	WDAN-TV	24
Denver	KBTV	9
Des Moines	WOI-TV	4
Detroit	WXYZ-TV	7
Green Bay	WFRV-TV	5
Harrisburg	WTPA	71
Houston	KTRK-TV	13
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Indianapolis	WTTV	4
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Salt Lake City	KUTV	2
Schenectady	WTRI	33
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Tulsa	KTVX	8
Washington, D. C.	WMAL-TV	7
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Wilkes-Barre	WILK-TV	34

9:00-10:30 PM, SUNDAY, LOCAL TIME

Albuquerque	KOAT-TV	7
Bakersfield	KBAK-TV	29
Fresno	KJEO-TV	47
Los Angeles	KABC-TV	7
Portland, Ore.	KLOR	12
Sacramento	KCCC-TV	40
San Diego	XETV	6
San Francisco	KGO-TV	7
Seattle	KING-TV	5
Spokane	KREM-TV	2

2:30-4:00 PM, SUNDAY, LOCAL TIME

Boston	WBZ-TV	4

4:00-5:30 PM, SUNDAY, LOCAL TIME

Louisville	WHAS-TV	11

9:30-11:00 PM, SUNDAY, LOCAL TIME

Pensacola	WEAR-TV	3

3:30-5:00 PM, SUNDAY, LOCAL TIME

Steubenville, O.	WSTV-TV	9

4:30-6:00 PM, SUNDAY, LOCAL TIME

Syracuse	WHEN-TV	8

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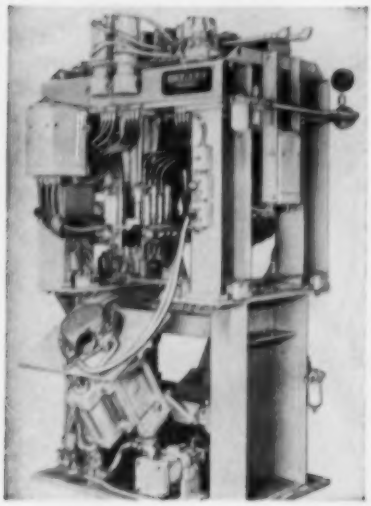


that support and locate transformers, welding guns and hydropneumatic boosters to suit the shape of the part being welded. *Write*: Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill. *Phone*: Portsmouth 7-5600

Plastic Pipe

Schedule PR-150 is a line of polyvinyl chloride pipe that has a uniform pressure rating in all sizes.

There are two types in the new series. One has a high chemical resistance and a maximum working pressure of 150 psi at 75°F. The other has high impact strength and a rating of 125 psi at 75°F.

The pipe comes in eight sizes, from ½ to 4 in. Wall thicknesses range from 0.050 to 0.230 in.

The pipe is odorless, nontoxic, nonporous, tasteless, noncontaminating, abrasion resistant and nonflammable. Friction loss is low. *Write*: Alloy Tube Division, Carpenter Steel Co., Union, N. J. *Phone*: Murdock 6-7230

Cutoff Machine

With ferrous metals, the M-75s make 550 cuts an hour. Tolerances are held to less than 0.005 in. Further machining is not needed.

Fully automatic bar stock feed and a power stroked head make production line work completely automatic.

The cutting head has a geared-in-head positive drive that delivers all the power to the cutting wheel.

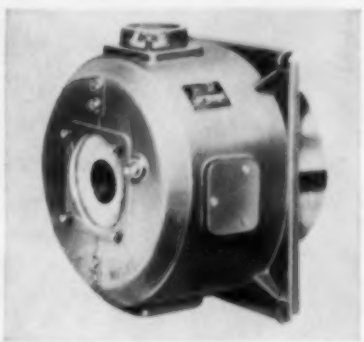
The machine will handle 1½-in. solid rounds with ease. *Write*: Stone Machinery Co., Manlius, N. Y. *Phone*: 62-2411

Blended Flame Unit

Up to 1000 per cent excess air is used by this unit to complete fuel combustion and improve the circulation of heat at 400 to 1800° F. It is for industrial furnaces, ovens, kilns and other heat processing equipment.

Localized hot spots are avoided. The unit assures a stable flame and prevents the entry of excess air from interfering with the ignition and combustion of the fuel within the refractory tile.

Excess air flow is outside the tile, so that blending takes place



only at the tile outlet and periphery of the flame.

The path of the excess air is as straight as possible in the blending stage. Combustion goes to completion before complete blending takes place. This reduces the formation of aldehydes, noxious fumes, smoky haze and objectionable odors. *Write*: Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y. *Phone*: South 8-7309

Conveyor Loader

The Lanceveyor automates the loading and unloading of trucks and freight cars.

The self-contained conveyor belt is automatically extended or retracted to compensate for space changes as the load is increased or reduced. It also can be raised or lowered to be level with the bed or top of the truck or any intermediate height.

The speed of this conveyor can

be synchronized with the pace of the plant conveyor. *Write*: Lance Iron Works, Box 310R3, Chicago Heights, Ill. *Phone*: Skyline 5-0444

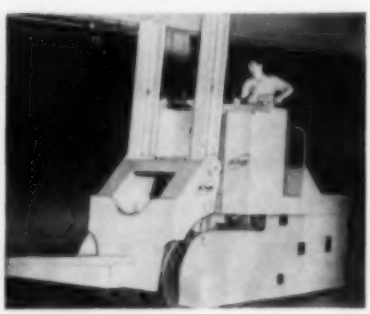
Gas Analyzer

This laboratory model measures all gases except the diatomics. A negative filter, nondispersive instrument, it enables process engineers to study gas characteristics in existing systems.

It makes a rapid analysis of carbon and sulphur in steels and lube oils. *Write*: Baird Associates-Atomic Instrument Co., 33 University Rd., Cambridge 38, Mass. *Phone*: University 4-0101

Ram Truck

Dual drive motors on this truck (capacity, 30,000 lb) meet severe power demands. Power brakes and power steering provide maximum efficiency and safe handling.



A simplified lift mechanism eliminates the lift chain. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

Machine Tool Relay

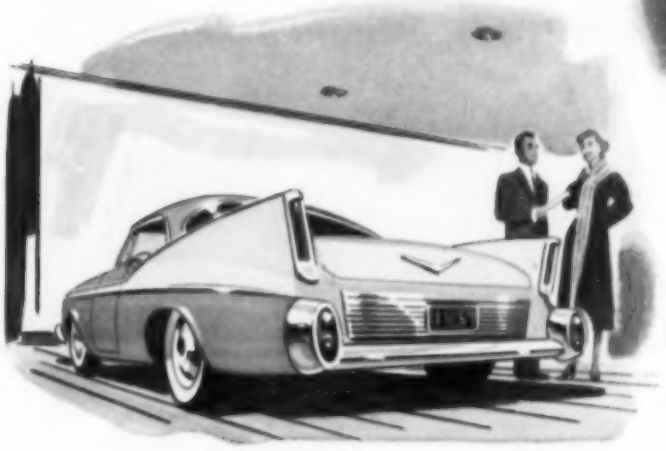
Here's a NEMA Type A1B relay (6 pole, in-line, 10 amp) for machine tools and control panels.

A saddle-type terminal permits wiring from four directions with

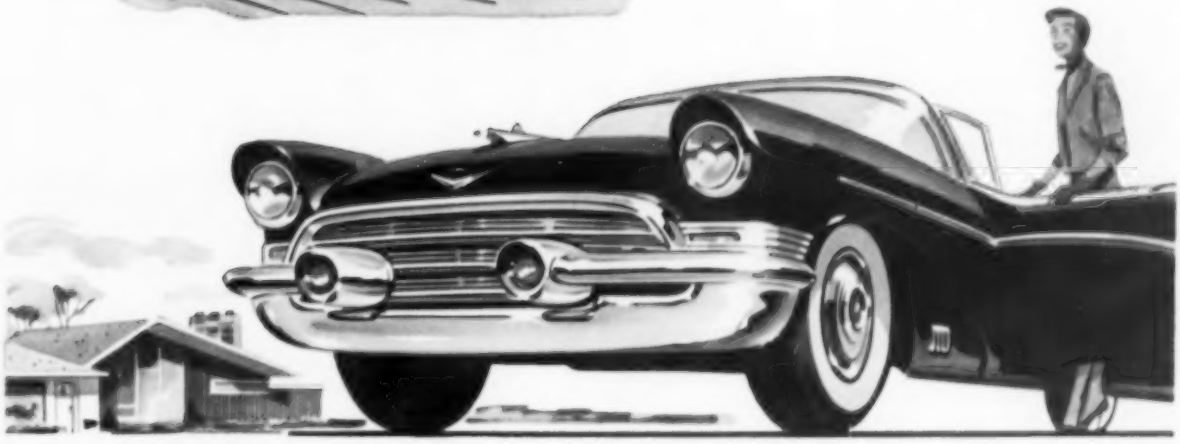
in automobiles

everybody benefits from Stainless Steel

THE MANUFACTURER styles your car with Stainless Steel because it's the readily workable, long lasting metal with beauty and sales appeal.



THE DEALER is proud and confident to offer a product made with Stainless Steel. He knows that nothing compares with Stainless for durability and customer satisfaction.



THE PURCHASER from long experience recognizes Stainless Steel as the easy to clean metal that keeps its shape and good looks under the toughest conditions of driving and weather. Also it's a big plus at trade-in time.

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FOR THE PRODUCT YOU MAKE TODAY AND THE PRODUCT YOU PLAN FOR TOMORROW SPECIFY McLOUTH HIGH QUALITY SHEET AND STRIP STAINLESS STEEL

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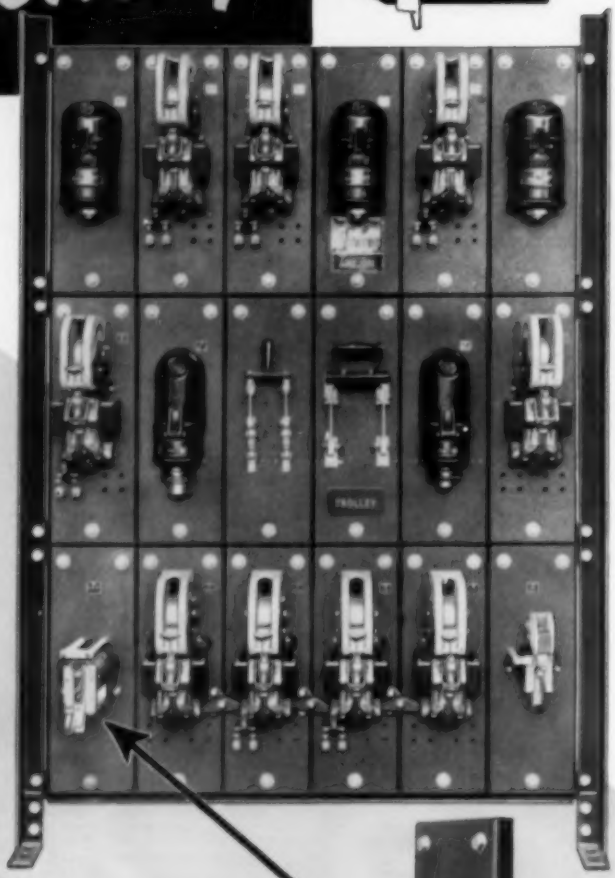
when stopping DC Motors

EC&M's Rectifier Plugging Control System gives FULL PROTECTION!



• This is the simplest of all plugging control systems for D.C. mill and crane drives. Only a small rectifier and single-coil mill-duty relay are required. They are connected across the motor armature for operation by counter-emf. The relay allows the plugging contactor to close immediately when starting from rest. When reverse-power plugging is applied to stop the motor, the rectifier permits the relay to pick up and hold open the plugging contactor. As the motor reaches stand-still, the relay drops out to close the plugging contactor and to allow acceleration in the opposite direction.

TWO-STEP PLUGGING CONTROLLERS are available for use on heavy inertia loads such as ore bridge trolleys and ladle crane bridge motions. Ask an EC&M Engineer to explain the improved operation of D.C. motors by Rectifier Plugging.

HERE'S WHY EC&M GIVES MOTOR DRIVES BETTER PROTECTION

- ✓ **POSITIVE RESPONSE** • Relay operates directly from counter-emf of motor.
- ✓ **RELIABLE OPERATION** • Unaffected by line voltage variation. Unaltered if taps on accelerating or plugging resistors are changed.
- ✓ **FULL PROTECTION** • Relay picks up at any speed above 10% of F. L. motor speed. Drop-out occurs as motor reaches standstill.
- ✓ **SIMPLICITY** • Single-coil relay and small rectifier. No electrical interlocks.
- ✓ **LESS MAINTENANCE** • Relay does not require adjustment-maintenance.

View of Type FKP Relay used on EC&M D-C Magnetic Controllers

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EC&M DIVISION • CLEVELAND 28, OHIO

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ALSO stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

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NEW PRODUCTS and equipment

either plain wire or crimped-on terminal connections.

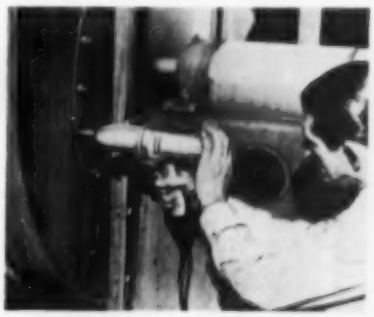
All terminals can be reached from the front of the unit. A permanent air gap eliminates any malfunction resulting from residual magnetism. Contacts can be changed easily from normally open to normally closed or vice versa without extra parts.

Tests indicate an average, troublefree life of 20 million operations. The relay comes in models for all voltages and frequencies up to 600 volts, 60 cycles. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Impact Wrench

This 7-lb tool delivers 1800 high-intensity impacts a minute. Maximum torque is reached in 6 seconds.

The wrench cannot be stalled or overloaded. A centrifugal fan and ventilating system cool the tool.



Other portable tools drive screws and drills. *Write*: Black & Decker Mfg. Co., Towson 4, Md. *Phone*: Valley 3-4400

Tractor Shovel

Model HH has a four-wheel drive and a capacity of 1¾ cu yd—1 1/3 cu yd struck. Model HU has a capacity of 1 1/3 cu yd—1 cu yd struck.

A torque converter gives infinite speed ratios for maximum performance. Both models use power-transfer differentials which automatically transfer additional torque to the wheel with the best footing.

A shock absorber cushions the

PROTECT WORKERS

Cut glove costs with JOMAC HAND GUARDS

Here's rugged, common-sense protection for your workers, real economy for you. Jomac Hand Guards armor bare hands, stretch glove life when worn over gloves. Widely used in the automotive field, they're practical in scores of industries—for handling raw materials, parts and finished goods, castings, forgings, sheet steel and sheet metal assemblies. They are interchangeable—can be worn on either hand—are made of durable, springy 32 oz. Jomac Cloth. They offer clear-cut *proof that quality means economy.*

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Jomac manufactures all types of hand and forearm protection—all made from famous loop-pile Jomac Cloth. Get complete details. Write for new Jomac Industrial Work Gloves Catalog. Jomac Inc., Dept. E, Phila. 38, Pa.

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Plants in Philadelphia, Pa., and Warsaw, Ind. In Canada: Safety Supply Co., Toronto

NEW PRODUCTS and equipment

load during travel cycles and allows fast movement of material over rough terrain. *Write*: Frank G. Hough Co., 876 Seventh Ave., Libertyville, Ill. *Phone*: 2-4000

Fire Extinguisher

Here is a dry chemical system for flammable liquid and electrical fire hazards. It can be operated automatically or manually.

The 30-lb piped system is intended primarily for the protection of paint spray and dip operations, heat treating and oil quenching, ovens, overhead cranes and stationary engines.

A dry chemical unit is installed near the hazard. A CO_2 gas pressure cartridge furnishes pressure to expel the dry chemical onto the fire through piping connecting the dry chemical unit with the hazard area. *Write*: Ansul Chemical Co., Marinette, Wis. *Phone*: 2-4411

Steel Basket

This container weighs about 2000 lb and is capable of handling a workload exceeding 10,000 lb. It is for moving heavy aluminum castings to and from heat treating furnaces and quenching tanks.

The basket is 84 x 60 x 51 in. Four lifting hooks make it easy to handle loads with a crane. A door in front of the basket makes unloading easy. *Write*: Wiretex Mfg. Co. Inc., 40 Mason St., Bridgeport 5, Conn. *Phone*: Forest 6-3494

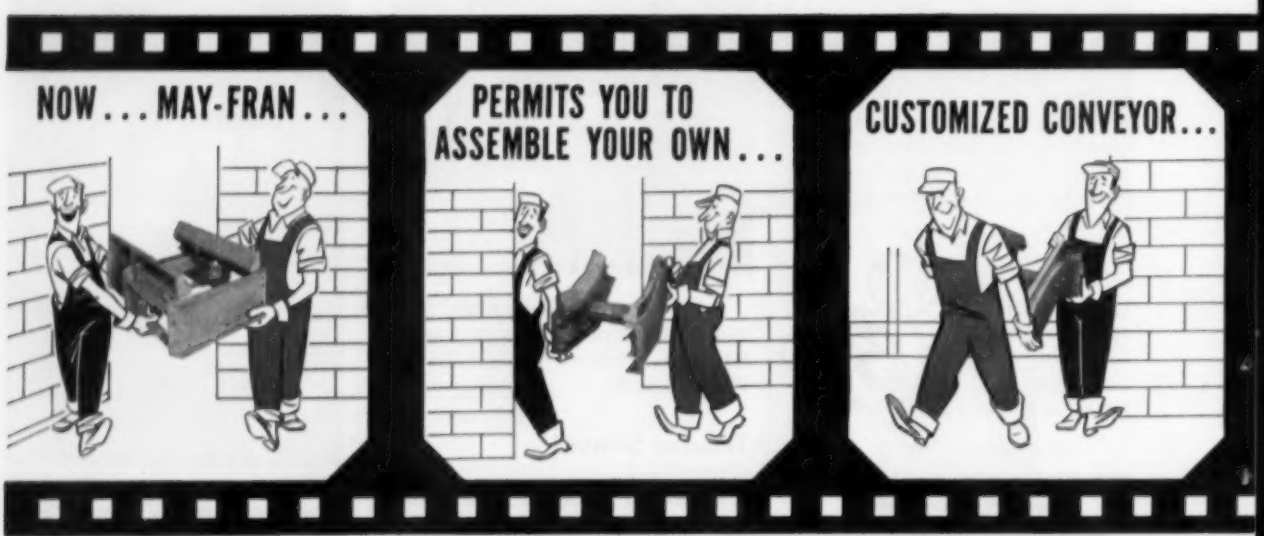
Spring Wires

Trucoat and Micro-Tin were developed to provide closer dimensional and load tolerances than other spring wires.

Trucoat has a nonmetallic coating which lowers out-of-roundness. The coating provides lubrication during coil winding and is easily removed for plating.

Micro-Tin facilitates the winding of corrosion-resistant springs to more precise limits. An improved coating process almost eliminates lumps and surface irregularities.

Both wires are made in all conventional sizes. *Write*: National-Standard Co., Niles, Mich. *Phone*: 1700



Whether you give first consideration to cost . . . or to the overall efficiency of an installation . . . the MAY-FRAN CONVEYOR STANDARDIZATION PROGRAM provides benefits never before possible.

Through STANDARDIZATION, you now can build your own CUSTOMIZED conveyor to meet your own individual needs. The MAY-FRAN components . . . mass produced . . . can be assembled into virtually any type of hinged-steel conveyor for the handling of stampings, formed metal parts, forgings, automotive scrap, chips and turnings.

Straight sections . . . concave or convex sections . . . take-up and discharge-end sections can be furnished to meet specific requirements of belt width as well as load bearing and volume capacities.

These pre-fabricated units are available rapidly and at low-cost. You save money many ways with MAY-FRAN standardization because . . . conveyors can be assembled by your own plant personnel . . . conveyors can be modified in any way when production needs change . . . conveyors can be dis-assembled and moved to other plant locations.

NEW literature

Write directly to the company for a copy

Pearlitic Malleable Iron

A 24-page bulletin describes the strength and machinability of pearlitic malleable in highly stressed parts. Research Department, Albion Malleable Iron Co., Albion, Mich.

Broaching Machines

Operating advantages of a line of horizontal guided-ram-type surface broachers with capacities of 10 to 25 tons are presented in bulletin HM-56, 4 pages. Colonial Broach & Machine Co., P. O. Box 37, Harper Station, Detroit 13, Mich.

Wheel Dressing

You can do a better job of wheel dressing with this toolholder: It turns a diamond easily—2 pages. Cleveland Industrial Tool Co. Inc., Skaneateles, N. Y.

Noise Control

Protective equipment for noise control is evaluated in a bulletin. Sigma Engineering Co., 1491 N. Vine St., Hollywood 28, Calif.

Precision Grinding

An automatic balancing feature for grinding machines is described in a 12-page bulletin, G-637-2. Cincinnati Milling Machine Co., Cincinnati 9, O.

Oilers

This 2-page bulletin describes an oiler that automatically maintains oil at a constant level in a bearing reservoir. Oil-Rite Corp., 2309 Waldo Blvd., Manitowoc, Wis.

Truck Casters and Wheels

Catalog K-40, 68 pages, gives information on caster selection. Department A, Bond Foundry & Machine Co., Manheim, Pa.

Steel Pipe and Fittings

Bulletin 145-A, 4 pages, lists properties of an intermediate chromium-molybdenum alloy steel for elevated-temperature service. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Conveyor

A pan linked conveyor for moving heavy parts, such as stampings, castings and forgings, is described in bulletin PL-42, 4 pages. Hapman Conveyors Inc., Kalamazoo, Mich.

Window Washing

Equipment that attaches to a building is described. It helps window washers reach windows quickly. Bulletin 2022-A, 16 pages. Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O.

Hydrometers

Bulletin G-3, 8 pages, describes a line of hydrometers and thermohydrometers graduated in specific gravity and other density scales. Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia 30, Pa.

Thermocouple Insulators

Dimensions, sizes and types of insulators for high thermal shock, high temperature and high mechanical strength needs are listed in bulletin 300-56, 4 pages. Claud S. Gordon Co., 3000 S. Wallace St., Chicago 16, Ill.

Temperature Control

Bulletin 5.5-1, 2 pages, describes the use of instruments and controls to maintain the boiling point and concentration of the solution used in the Houghto-Black coating process. A radiation pyrometer for small targets

For complete information, write today for your copy of MF-Bulletin 200

MAY-FRAN ENGINEERING, INC.
1725 Clarkstone Road • Cleveland 12, Ohio

broken sardines and cut fingers

You avoid broken sardines and cut fingers when you open stubborn cans with their handy keys—keys which are often made from special uniformly tempered, low carbon CF&I-Wickwire Can Key Wire.

Chances are you don't need wire to make can keys. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

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Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
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Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Bail Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
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CF&I-WICKWIRE WIRE

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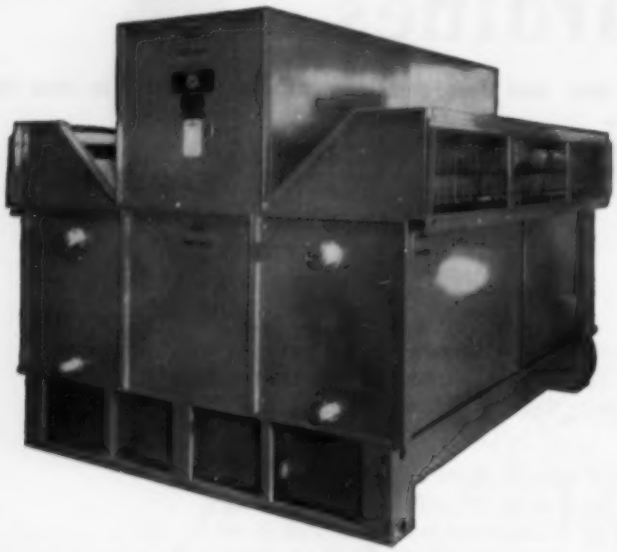

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***Aero* HEAT EXCHANGER**
gives close temperature control, saves you ***LABOR,*** *Power, Water*

- **Because the new design improves the heat transfer to the out-door air by evaporation.**
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You get faster, more accurate cooling of industrial fluids to specified temperatures.

You improve your quality of production by removing heat at the rate of input.

You save labor in upkeep. With full access to all interior parts and piping you see everything in easy inspections. You head off dirt accumulation and corrosion. Casing panels are removable without moving the coils. The coils can be cleaned from both sides.

First cost is low; freight is low because of the lowest space/weight ratio; you save much labor in erection. Capacity range is 7,000,000 to 18,000,000 Btu/hr. No other heat exchange method gives you so much saving in money and convenience.

Write for Niagara Bulletin 132. Ask for the full story of how you can save expense in your plant and improve your product's quality.

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District Engineers in Principal Cities

NIAGARA — *Over 40 Years' Service in Industrial Air Engineering*

NEW LITERATURE

is covered in bulletin S939-4, 2 pages. Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44, Pa.

Industrial Waste Treatment

Equipment for water sewage and industrial waste treatment is presented in catalog 905, 64 pages. Jeffery Mfg. Co., Columbus 16, O.

Phosphating

A line of phosphating and metal protective coating materials is described in a 4-page bulletin. Turco Products Inc., 6135 S. Central Ave., Los Angeles 1, Calif.

Sheet Feeder

A 6-page bulletin describes a feeder that handles 150 sheets of 38 to 20 gage material a minute. Dexter Folder Co., 330 W. 42nd St., New York, N. Y.

Bending Presses

Bulletin 56HB, describes a complete line of hand operated bending presses. Dries & Krump Mfg. Co., 7400 S. Loomis Blvd., Chicago 36, Ill.

Batteries

Advantages of positive-plate design for batteries that perform stationary power services are given in bulletin 5916, 6 pages. Industrial Division, Electric Storage Battery Co., Box 8109, Philadelphia 1, Pa.

Circular Weldments

An 8-page bulletin pictures weldments and rings made by this company. Special Products Department, Dresser Mfg. Division, Dresser Industries, Bradford, Pa.

Control Panels

Bulletin GEA-6334, 12 pages, presents panels that can be used on grinders, lathes, conveyors, drilling machines, presses and other machines. General Electric Co., Schenectady 5, N. Y.

Forged and Rolled Rings

An 8-page bulletin describes the advantages of seamless forged and rolled rings made from leaded steel. Alco Products Inc., P. O. Box 1065, Schenectady, N. Y.

Fluid Drives

Type VS, class 2 fluid drives (1 to 25 hp) are described in bulletin 9819, 8 pages. Hydraulic Coupling Division, American Blower Corp., Detroit 32, Mich.

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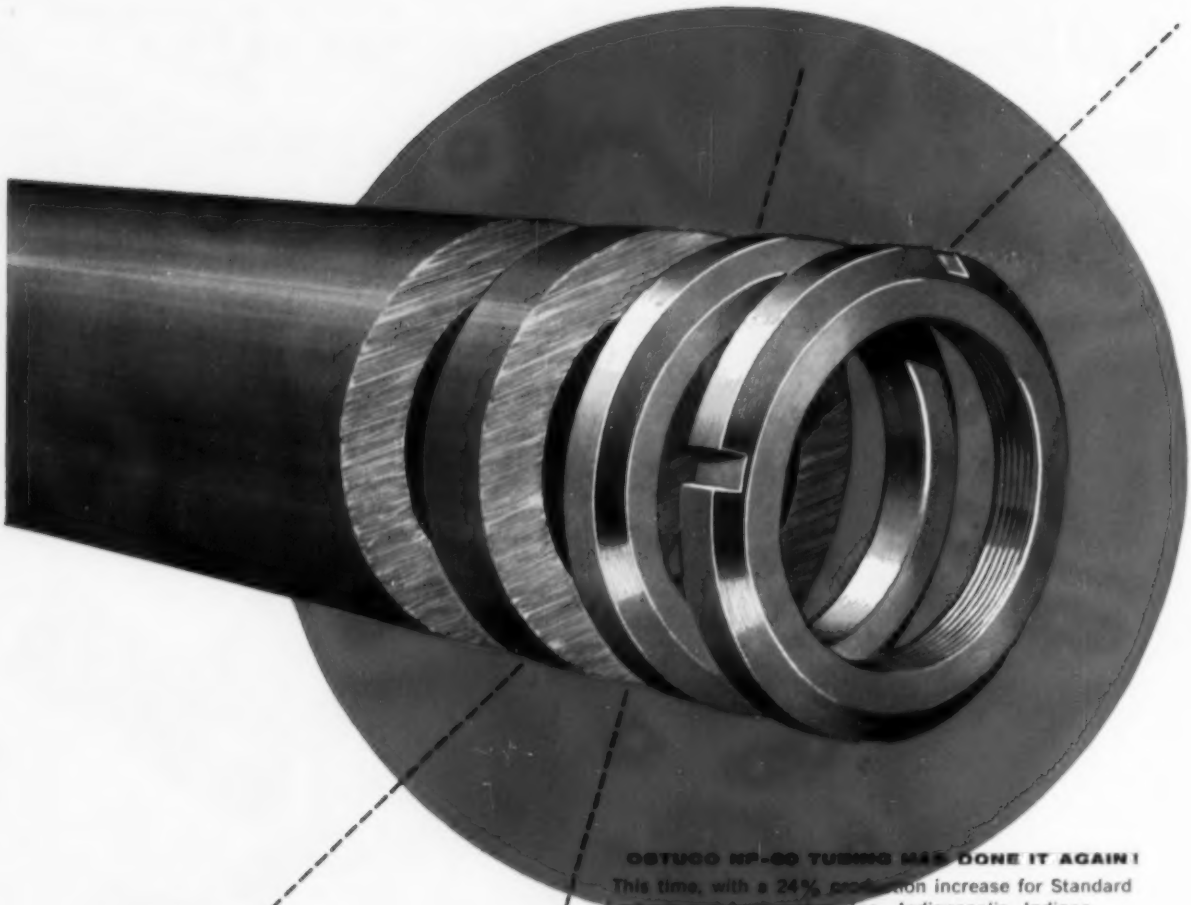
EATON PERMANENT MOLD GRAY IRON CASTINGS

PERMANENT MOLD GRAY IRON CASTINGS meet critical quality requirements, including intricately cored sections, in a wide range of applications. These castings permit higher machining feeds and speeds, with substantially increased tool life. Characteristics of these castings include dense, non-porous, homogeneous structure, freedom from inclusions, excellent tensile strength, and the ability to take high surface finishes.

These qualities particularly recommend Eaton Permanent Mold Gray Iron Castings for such uses as high pressure control mechanisms, refrigeration and air conditioning parts, power steering and power braking components, household appliance parts, pump bodies, hydraulic cylinders, and countless other critical applications.

If you have applications where more than ordinary quality is required, our engineers will be happy to work with you.

EATON MANUFACTURING COMPANY — *FOUNDRY DIVISION* — VASSAR, MICHIGAN



24% Production increase at Standard Locknut & Lockwasher, Inc. after switching to OSTUCO NP-60 tubing

OSTUCO NP-60 TUBING HAS DONE IT AGAIN!

This time, with a 24% production increase for Standard Locknut & Lockwasher, Inc., Indianapolis, Indiana. Tubing experts from OSTUCO recently recommended a switch to NP-60 Tubing specially processed for machineability for Standard's locknut and lockwasher line used in ball and roller bearing applications.

Standard components find their way into electric motors, machine tools, automotive, aircraft, farm and construction equipment. Other companies, with equally diverse applications, report similar success with NP-60. If you are machining bearings, washers, collars, or any circular part, you'll do well to check into the merits of OSTUCO's new NP-60 seamless steel tubing.

GET NP-60 WITH "SINGLE-SOURCE SERVICE."

New NP-60 seamless tubing comes to you with OSTUCO'S unique "Single-Source Service"—experience and facilities for design and development, production and delivery all under one roof. Get together with a tubing expert for preliminary planning on NP-60's possibilities in your product. Contact your nearest sales office or write direct to the factory.

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CANADA, RAILWAY & POWER ENGR. CORP., LTD.

EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY 225 Broadway, New York 7, New York

STEEL
October 15, 1956

Market Outlook

EVERYONE'S watching the automobile industry for clues about the strength of steel demand.

In some quarters, the auto companies have signified they will take as much steel as the mills have allotted them for November and December deliveries. Some have indicated they would like to have more.

POSSIBILITY—A real push for steel by auto makers would squeeze supplies, for over-all demand already is good. The auto industry normally gets around 20 per cent of the steel output and is the largest single user. For several months, its take has been light. Not only would a sharply accelerated demand by the auto makers fill the gap in the steel market, but it would spur others to do protective buying.

The auto industry has programmed more than 511,000 passenger cars for October—the best since April's output of 547,766. The industry is talking of 1.7 million to 1.8 million for this quarter. This would require a step-up in November and December production.

EFFECT—A surge of buying by the auto makers would hit the lighter forms of steel, such as cold-rolled carbon sheets—a product which has been in fairly easy supply over the last several months. Heavier forms of steel—like structural shapes, plates, large bars and large sizes of seamless tubing—have been in strong demand for quite awhile.

RECORD—To help fill orders on the books, the steel industry set a weekly production record in the week ended Oct. 14. It produced 2,511,000 net tons of steel for ingots and castings. This is 11,000 tons over the record set in the preceding week. In setting the record, the industry produced raw steel at 102 per cent of the Jan. 1 rated capacity. The preceding week's rate was 101.5 per cent.

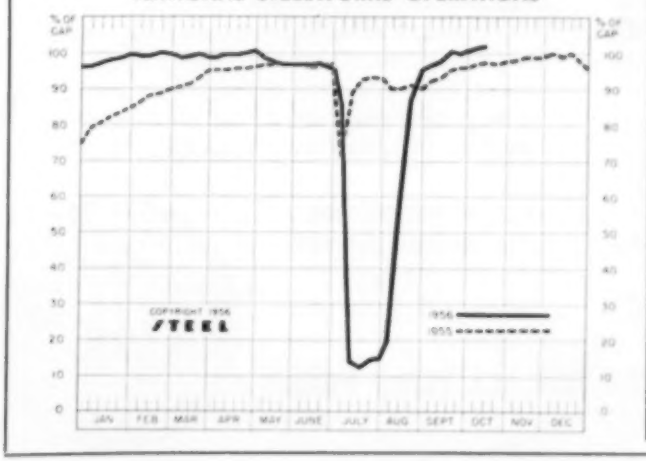
CONFIDENCE—The steel industry will hold in 1957 to the high production levels of 1956 and 1955, Joseph L. Block, president, Inland Steel Co., Chicago, believes. Favorable in the 1957 outlook, he points out, is assurance of labor peace and the stated expectation of increased use of steel by all consumers.

The outlook is moderated, though, by two things, Mr. Block explains. Heavy installment debt might make increased consumer buying difficult, and high interest rates and a shortage of loan money might retard construction.

WORKING AHEAD—Steel producers are beginning to open their books for orders for the major products for the first quarter of next year. The end of this month should see mills accepting first quarter tonnage in one degree or another—either on a month-to-month basis or for the entire quarter. Some may do both, depending upon the products. On some of the items in weak demand (like cold-finished carbon bars, alloy bars, certain wire products and sheet specialties), mills have been taking any first quarter orders offered.

PRICES—Except for a few minor fluctuations, steel prices are steady. Reductions in merchant wire products lowered STEEL's price composite on finished steel 27 cents a ton. The composite now is $137.48 a net ton. Steadiness in the scrap market kept STEEL's price composite on steelmaking grades at $57 a gross ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Oct. 14	Change	Same 1955	Week 1954
Pittsburgh	102.5	+ 1	101.5	71
Chicago	101.5	+ 1*	97.5	76
Mid-Atlantic	100.5	0	94.5	65
Youngstown	101	0	98	72
Wheeling	104	0	98	87.5
Cleveland	105	— 2*	103.5	80
Buffalo	107.5	0	105	70.5
Birmingham	95.5	0	97.5	74
New England	80	+ 5	90	59
Cincinnati	95	+ 3.5	91.5	65.5
St. Louis	100	0	97.5	76.5
Detroit	101	0	94	80
Western	103	+ 3	99	88
National Rate	102	+ 0.5	97.5	73.5

INGOT PRODUCTION‡

	Week Ended Oct. 14	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	156.3†	156.0	154.2	145.0
NET TONS (In thousands)	2,511†	2,506	2,477	2,339

*Change from preceding week's revised rate.
†Estimated. ‡Amer. Iron & Steel Institute.
Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 63 Technical Outlook—p. 119

Shop Superintendent Bonnafe and Gulf Sales Engineer G. R. Burnham check on performance of Gulfcut 51A as turret lathe turns a stainless steel drive roll for a wire belt.

"Gulfcut gives us longer tool life,"

says Joseph Bonnafe, Shop Superintendent, J. W. Greer Company, Wilmington, Mass.

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Fastener makers and users cut paper work as . . .

Net Pricing Takes Hold

ALMOST everywhere you go in the fastener industry today you come up against the same problem: "Should we go to net pricing or stick with list and discount?" The leaders are going to net; others agree that it's a trend they must study.

The basic difference between the two methods is that in net pricing the producer does most of the mathematics, eliminating as much as 50 per cent of the paper work for the customer. Initially, this involves hundreds of hours of clerical work by the producers, but once basic schedule is made up, billing time can be cut by as much as 35 per cent.

Beginning — There is nothing unique about net pricing as such—steel producers have used it for years, and some fastener manufacturers have applied it to certain products and customers for some time. But the trend toward full-scale use is a recent development. Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., got the ball rolling in August by net pricing its bolt line. It has used the system on special items for several years, one company official explaining: "There is no other practical way to price specialties."

Cleveland Cap Screw Co., Cleveland, abandoned list prices and discounts in September and established net prices on its entire hex-head capscrew line, flathead capscrews, fillister head capscrews, cup point setscrews and milled studs. Lamson & Sessions Co., Cleveland, points out it has been using this method on its capscrew products since 1950. Management is studying its application to other products. Pittsburgh Screw & Bolt Co., Pittsburgh, has a "trial" net price schedule out on three of its popular bolt products. If it's popular with the customers, the method can be applied to other products. American Nut & Bolt Fastener Co. publishes both net and list prices on standard products, giving the customer his choice of bookkeeping. Others are studying the development.

Resistance—While the trend has been established, it is meeting some stern resistance, especially from smaller manufacturers and producers for specialized industries. Some claim they have been using list and discount successfully for many years and can see no reason to change. They say it is easier to revise lists when prices change. Others feel they do not have the time or personnel to go through the hundreds of types and sizes and convert them all to a net basis. Still others, especially those in the Detroit area who sell primarily to the automotive industry, say its a moot question with them. They sell on bid prices which are net cash to the customer. They admit that the few jobbers to whom they sell have been putting the pressure on for net prices. One major producer thinks it will be the industry practice within a year.

Many of the small companies in the industry admit that if customers demand the new method, they'll have to go along with it. It's a matter of servicing an account, and the savings involved in clerical work could be a controlling factor in buying from one company or the other. Actually, there is no difference in the end price of the product. But jobbers claim the net pricing method makes it easier for them to establish their resale levels.

Powerful Force—Jobbers have been influential in several ways. They have been after producers for years to come up with a simplified pricing system. They also have been successful in getting fastener manufacturers to up their discount for cash payment within 10 days from about 1 or 1.5 to 2 per cent. Explains one manufacturer: "Our jobbers have given their customers a 2 per cent cash discount for years and feel that they should get a better break from us. We probably wouldn't have done it if they hadn't been so persistent."

The feeling is not mutual among the smaller manufacturers who must operate on a closer cost basis. One Detroit boltmaker has declared he will not follow the practice even though it becomes industrywide. "I don't like to do business with customers who have to be bribed with a 2 per cent discount. All my customers have been prompt with their accounts without any 'gimmicks.' If this becomes industry practice, I'll simply reduce the price of our line by an equal amount," he states.

Fasteners . . .

Fluorspar Prices, Page 179

Industrial fastener requirements are beginning to increase due to rising demand from the automotive industry. Although railroad needs were strong throughout the summer, third quarter volume was down. Customers accumulated large stocks early in the year.

With auto industry getting active on new model runs, the outlook is promising for a rise in sales during November and December.

Wire . . .

Wire Prices, Pages 175 & 176

Users of manufacturers wire, heading and spring grades, are not building inventory to the extent they did last spring in anticipation of the steel strike and price increases. There are openings in mill schedules for November in most sizes and grades. Mills have caught up on most of their delinquent tonnage, and deliveries are back to normal on a wide range of carbon wire items. Heaviest backlog is in low carbon heavy sizes, largely used for reinforcing.

The American Steel & Wire Division, U.S. Steel Corp., early this month adjusted prices downward on a number of merchant wire products. They included bale ties and automatic baling wire, barbed wire, nails and staples, merchant quality wire and fencing.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 174 & 175

Cold-rolled sheet sellers are confident they will have all the business they can handle before the current quarter ends, but sluggish specifying by the auto builders has had mill sales managers guessing. There have been some deferments of shipments, even tonnage cancellations, but the volume involved has been relatively small.

Much heavier automotive demand is expected for first quarter next year. Also, household appliance makers are thought likely to be more active buyers before year end. In fact, consumers in general are thought likely to step up their buying for inventory before long.

There are open spaces in some mill order books, not only in cold-rolled sheets, but in enameling stock and galvanized as well. Specifications for low silicon sheets from fractional horsepower motor manufacturers continue to be slow. Hot-rolled sheets continue to move actively. This grade is in relatively tight supply, and consumers not only are accepting full allotments, but are pressing for even larger tonnage.

Among more active buyers of cold rolled in the East are manufacturers of stoves, fluorescent lighting fixtures and light containers. Electrical appliance manufacturers appear to be fairly well fixed for tonnage.

A Chicago mill closed its December books Oct. 1, two weeks ahead of the normal expiration of lead time. This was done to permit an accurate appraisal of its sheet position. Customers were advised that unless they indicated otherwise by Oct. 1 it would be considered that they would take their full allocations.

Several producers are beginning to allot first quarter production. These mills say customers appear more interested in tonnage for that position than for the fourth quarter.

Calstrip Steel Corp., Los Angeles, recently reduced its price on low carbon cold-rolled strip from $8.90 to $8.80 per 100 lb, f.o.b. Los

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Angeles. At the same time, it revised edge extras for strip steel in widths ½-in. and narrower: No. 1 edge, $4; No. 4, $3; No. 5, $2.25; No. 6, $3.

Tubular Goods . . .

Tubular Goods Prices, Page 177

Tubular goods makers report their fourth quarter order books are full. Most producers are taking orders for the first quarter of next year. They say pressure and mechanical tubing demand will be heavy through January, and probably through the first quarter of 1957. Oil country goods demand continues in excess of supply.

There will be a carry-over of unfilled orders for pressure, mechanical and oil country tubing amounting to about two weeks' production at the end of this quarter. Need for pressure tubing will continue heavy next year, as large utility expansion programs have been delayed from this year to early 1957 due to the shortage of structural shapes.

Steel Bars . . .

Bar Prices, Page 173

The over-all trend for hot-rolled bars is possibly a shade easier than it was a couple of weeks ago. Supply continues tight, and mill operations will be active the rest of the year.

Bar size flats and bar angles appear in strongest demand. Buyers report difficulty obtaining only the larger sizes of flats and rounds. Hot alloy bars are in easy supply, but this situation could change quickly with the resumption of strong automotive demand.

Because of restricted demand for cold-drawn bars, cold-drawn mills probably will not take their full November and December quotas of hot bars. One Pittsburgh producer will accept ony half its fourth quarter allotment, chiefly because of slow automotive demand for cold-drawn bars.

It is feared that suppliers of small parts to auto makers will not require large shipments of cold drawn in the closing months of this quarter.

Electric furnace alloy bars are moving at a slower pace in New England. There are openings in December mill schedules. Cold-drawn stock is available in the area in most sizes. A mild pickup in forge shop buying reflects the step-up in automotive demand, but auto buying is likely to be geared closely to car sales in the weeks ahead.

In the Midwest, only the farm implement builders are declining full steel allotments. The released steel is being distributed to other consumers. Total tonnage involved is not large, the principal product being hot-rolled bars.

The Peoria and Decatur, Ill., plants of the Caterpillar Tractor Co. are back in full operation after short strikes which idled 21,500 workers.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 173

Because of tight structural steel supply, many building projects are being redesigned for reinforced concrete construction. This is resulting in a tightening in building bars, and the situation is expected

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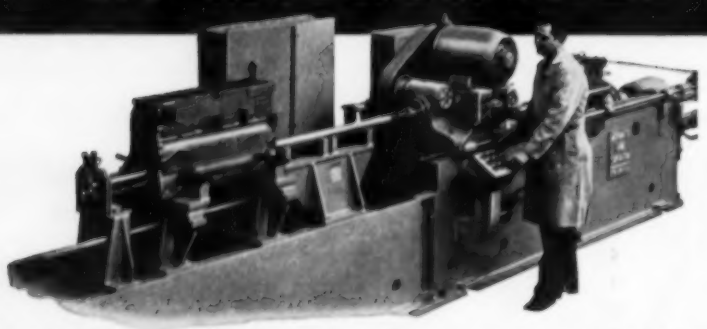
WHY CUMMINS main bearings are MICROHONED

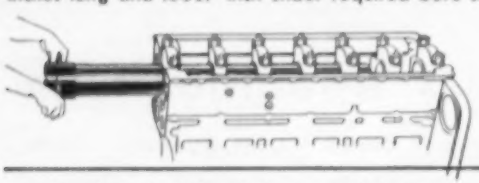


"Cummins diesel engines have a world-wide reputation for dependable, low-cost power. Here at Cummins, we attribute the wide acceptance of our engines to constant searching for better processing methods and improved engine performance.

"For example, if our crankshaft main bearings were undercut at the ends, tapered or out-of-round, then the full load of the journals would be borne by relatively small areas. This would cause bearing inserts to overheat and quickly break down. Also, should the bearings be misaligned, the crankshaft would flex during rotation and cause fatigue failure.

"However, by Microhoning our main bearings we secure *round, accurately-sized* and *aligned bores*. Cummins is the first diesel manufacturer to Microhone its main bearings. The surfaces of Microhoned bearings are clean-cut, free of deformed metal and the finish is consistent in every bore. In addition, the consistent accuracy generated by Microhoning permits us to make faster set-ups and use higher cutting feeds on preceding boring operations—Microhoning automatically corrects all inaccuracies.

"After Microhoning, all main bearing bores are checked with a gage plug 44 inches long and .0007 inch under required bore size. Gage must have a simultaneous slip-fit through all bores in the block. Tolerance for roundness is less than .0002 inch and finish is held to the specified 55 microinches."



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to become increasingly stringent as road building programs get going in a big way next spring.

Among recent large contracts was one for 5800 tons of bars required for the Wahluke siphon, Columbia Basin project in the Pacific Northwest.

Structural Shapes . . .

Structural Shape Prices, Page 173

Structural steel awards are somewhat scattered, but substantial tonnage is being figured, with fabricators anticipating a large volume of work ahead. Their major concern: Steel supplies.

Inventories continue to reflect last summer's steel strike, though they are in somewhat better balance. Wide flange sections present a bottleneck.

While there are few outstanding inquiries in the Philadelphia area, there are a number of small jobs out which aggregate substantial tonnage. They include schools, shopping centers, churches and small apartment houses. Were shapes in better supply, there would be more projects of this nature, and some active jobs would take larger structural tonnage instead of going partly to reinforced concrete construction. Fabricators are more selective in estimating.

Structural awards during the first eight months of this year ran well ahead of those in the corresponding period of 1955. The total was 2,733,287 tons, according to the American Institute of Steel Construction, a 17 per cent increase compared with 2,334,163 tons placed a year ago. August awards were below those in the like month last year, amounting to 268,273 tons, a drop of 14 per cent. They also showed a decline from July's 288,166 tons.

Shipments in the first eight months were up 11 per cent, totaling 2,103,161 tons against 1,902,461 in the same period last year. August shipments of 213,495 tons were up substantially over July but were off 20 per cent from the 268,362 tons moved in August a year ago.

On Aug. 31, backlogs totaled 3,076,351 tons, of which 1,191,163 tons were scheduled for fabrication during the four-month period ending Dec. 31.

Warehouse . . .

Warehouse Prices, Page 178

Warehouse trading this month is expected to be the heaviest since spring, surpassing September's volume which showed a decided gain over the preceding two months.

Inventories held by small fabricators have been trimmed to the point where they are beginning to replenish supplies.

Distributors' business in plates and shapes continues limited because of the shortage of stocks. Tonnage of both items is moving out of the warehouses about as fast as it is received from the mills. Bars and sheets are moving more actively.

Although sales are rising in the Midwest, consumers in that general area are still balancing out their inventories.

Plates . . .

Plate Prices, Page 173

Platemakers are expected to open their books for first quarter, 1957, orders soon. This includes the eastern mill which recently was forced to blank out its entire fourth quarter tonnage because of mechanical difficulties. It expects to resume operations shortly.

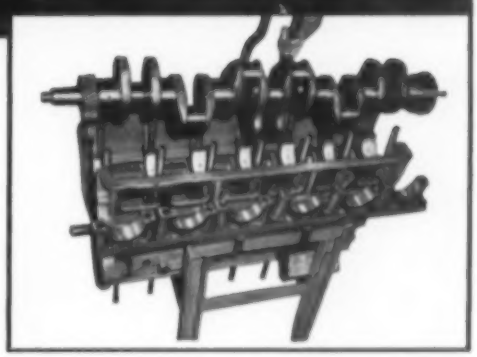
A major Pittsburgh mill will make its first quarter allotments late this month. Currently, the district mills are booked only through December, restricting acceptances in an effort to cut backlogs. Customers say deliveries are more nearly on schedule than they have been for many weeks past.

There is no question but what all first half production will be taken up by consumers, and it's doubtful if quotas for the period can be increased. Railroad and shipbuilding requirements are rising, and heavier demand for road building is anticipated in the spring.

Light plate requirements for underground gasoline station tanks, up to 3000 gallon, are heavier in New England. Tonnage from the strip mills is not sufficient to meet tank demand, although plates over ½-in. are still in tightest supply.

The bulk of shipments this month are against third quarter orders, and, while slightly heavier, tonnage is going directly into production of fabricated structures

HOW MICROHONING generates round, accurate, aligned bearing bores



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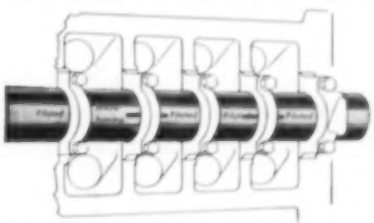
3. The single bank of abrasives travels through all bores on every stroke. As abrasives are Microhoning one bore, the tool is piloted by the plastic guides in the other bores.



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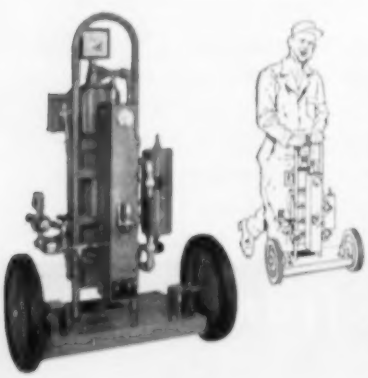

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without addition to depleted inventories. In some cases, the mills have only one month open in the last quarter for new bookings.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 170

Higher coal prices may not be reflected soon in the foundry coke market because of the advance in prices on this grade recently. Furnace coke, which has been holding relatively steady for some time, will probably advance.

Pig Iron . . .

Pig Iron Prices, Page 178

Pig iron consumption in the first six months of this year amounted to 36,247,594 gross tons, reports the U.S. Bureau of Mines. This compares with 33,542,854 in the like period of 1955.

Stocks held by consumers at the end of June amounted to 2,066,708 tons. This compares with 2,046,446 at the end of the preceding month, and 2,011,677 at the end of January.

Pig iron exported in June was valued at $935,175, compared with $462,071 in May; owing to a revised method of compiling export statistics on pig iron, the value but not the quantity is available.

Imports of pig iron totaled 42,376 in June, compared with 14,661 in May. In addition, 1254 tons of sponge iron were imported.

Merchant pig iron supply is adequate, but sellers are having no troube disposing of all available tonnage. The foundries are operating well. Because of the high price of scrap, they are using more iron in their mix than they would normally.

Iron sellers in the Midwest report stronger demand is developing, but they say inventory balancing is still going on.

Consumers of iron produced at Buffalo are taking as much tonnage as possible for lake shipments before the navigation season closes.

Japan continues to issue large inquiries for iron, but it is having little luck placing orders. It recently closed on 10,000 tons from an Alabama furnace, and is said to have placed an order for a similar tonnage with a western Pennsylvania stack.

Iron Ore . . .

Iron Ore Prices, Page 179

Iron ore shipments on the Great Lakes are running slightly ahead of those a year ago.

Tonnage moved in the week ended Oct. 8 was 2,794,730 gross tons, reports the Lake Superior Iron Ore Association. This compares with 2,783,173 tons in the like week last year. The week's total was under shipments in the last three weeks of September when weekly totals topped 3 million tons. The decline is attributable to lighter loading due to navigation regulations beginning with October.

Season shipments to Oct. 8 were 57,494,805 tons. This is more than 13 million tons below the 70,518,979 tons shipped in the corresponding period of the 1955 season. The drop is due to the steel strike.

Tool Steel . . .

Tool Steel Prices, Page 177

Shipments of high speed and tool steel (excluding hollow drill steel) were 16,394 net tons in July-August, reports the American Iron & Steel Institute. Because of the steel strike, July data were combined with the figures for August. July shipments were only 6040 tons, while the August total was 10,354 tons.

In the first eight months of this year, cumulative shipments were 87,089 net tons. This compares with 73,624 tons in the like period of 1955.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1800 tons, two-place painting garage, Boeing Airplane Co., Moses Lake, Wash., to Judson Pacific Murphy, San Francisco, $865,000.

540 tons, state highway bridge, Jonesport-Beal Island, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Bridge Construction Co., Augusta, Me., general contractor.

450 tons, service buildings and facilities, Massachusetts turnpike, to U.S. Steel Supply Division, U.S. Steel Corp. Boston; B. Perini & Sons Inc., Framingham, Mass., general contractor.

200 tons, addition to assembly and maintenance buildings reactor testing station, Idaho Falls, Idaho, to unstated interest; J. H. Wise & Son Inc., Boise, Idaho, low and awarded at $2,643,000.

250 tons, state bridge work, Adams county, Pa., to Mayer-Pollock, Pottstown, Pa.

STRUCTURAL STEEL PENDING

1400 tons, cadet quarter, Air Force Academy, Colorado Springs, Colo., general contract to Robert E. McKee Inc., Santa Fe, N. Mex., at $14,370,000.

750 tons, Montana state Yellowstone river bridge Dawson county; Riedesel Construction Co. and Schye, joint low contractors; awarded at $923,480.

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520 tons, hangar, Grenier Field, Manchester, N. H.; Davison Construction Co., Manchester, low on general contract.

400 tons, Junior School of Science, the Bronx, New York; bids Oct. 16.

295 tons, Delaware river bridge between Portland, Pa., and Columbia, N. J., bids to be received by the Delaware River Joint Toll Bridge Commission, Morrisville, Pa., Oct. 24.

275 tons, repairs, Longfellow bridge, Cambridge, Mass.; J. F. White Construction Co., Cambridge, low on general contract.

250 tons, public school No. 38, the Bronx, New York; bids Oct. 25.

210 tons, manufacturing and office building, Ford Motor Co., Green Island, N. Y.; Irwin & Leighton, Philadelphia, general contractor.

REINFORCING BARS . . .

REINFORCING BARS PLACED

5800 tons, Wahluke siphon project, Washington state, to Steel Constructors, Portland, Oreg.; general contract to E. W. Construction Co., Eugene, Oreg.

600 tons, Hayward Place garage, Boston, to Northern Steel Inc., Medford, Mass.; S. & A. Allen Construction Co., Boston, general contractor.

320 tons, Washington state girder overcrossings, Thurston county, to Bethlehem Pacific Coast Steel Corp., Seattle; T. T. Burnham Co., Seattle, general contractor at $247,640.

300 tons, high school, Framingham, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; B. Perini & Sons Inc., Framingham, general contractor.

285 tons, dispensary building, Boston, to Concrete Steel Co., Boston; M. S. Kelliher Co., Boston, general contractor.

175 tons, multiple span stringer bridge, Jonesport-Beal Island, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Bridge Construction Co., Augusta, Me., general contractor.

135 tons, construction for U.S. Indian Service, Polson, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

142 tons, Bureau of Public roads bridge, Pierce county, and Idaho State College, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

960 tons, office building, American Mutual Insurance Co., Wakefield, Mass.

250 tons, Bosworth street garage, Boston.

100 tons or more, 360-ft Bureau of Land Management bridge, Douglas county, Oregon; Tom Lillebo, Reedsport, Oreg., low at $78,257.

PLATES . . .

PLATES PLACED

1400 tons, Wahluke siphon undercrossing, Washington state, to Gunderson Bros. Engineering Corp., Portland, Oreg.

300 tons, 3-million-gal water tank, Alderwood Manor, Wash., to Hammond Iron Works, Provo, Utah, low at $113,305.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Boston & Maine, 50 all-purpose 1750-hp diesel-electric locomotive units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Norfolk & Western, 30 general purpose diesel locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

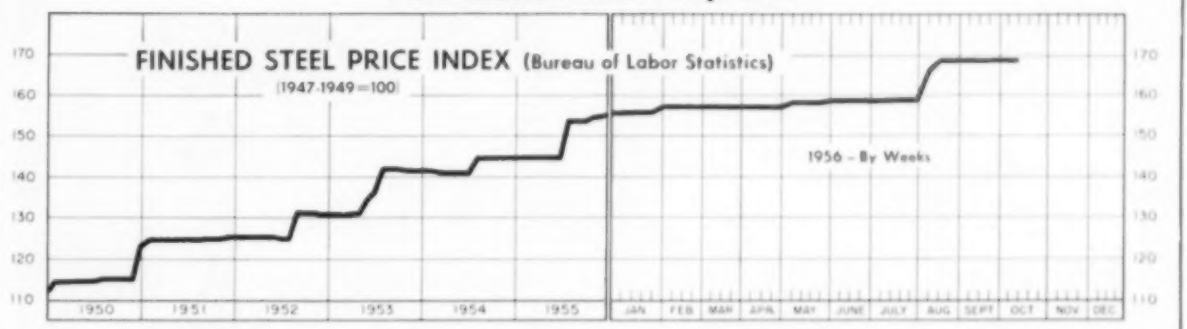
Chesapeake & Ohio, 2000 seventy-ton triple hopper cars, to ACF Industries Inc., New York.

Minneapolis & St. Louis, 30 fifty-foot insulated boxcars, to Pacific Car & Foundry Co., Renton, Wash.

RAILROAD CARS PENDING

Seaboard Airline, 2400 freight cars, bids asked; orders to be placed by the end of October will include 700 open-top hoppers, 900 gondolas, 300 pulpwood cars and 500 cement cars. The pulpwood cars and 200 of the gondolas will be equipped with roller bearings.

Price Indexes and Composites



Oct. 9, 1956	Week Ago	Month Ago	Sept. Avg.	Year Ago
168.6	168.6	168.6	168.6	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 9

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.276
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.885
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.565	Sheets, Electrical	11.225
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.274	Strip, C.R., Carbon	6.842
Bars, Tool Steel, H.R., Alloy, High Speed W18 Cr 4, V 1 (lb)	1.789	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 302 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.378
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
Tubes, Boiler (100 ft)	48.083	Black Plate, Canmaking Quality	7.133
Tubing, Mechanical, Carbon (100 ft)	22.972	Wire, Drawn, Carbon	9.175
Tubing, Mechanical, Stainless, 304 (100 ft)	187.133	Wire, Drawn, Stainless, 430 (lb)	0.630
Tin Plate, Hot-dipped, 1.25 lb	9.333	Bale ties (bundle)	7.213
Tin Plate, Electrolytic, 0.25 lb	8.033	Nails, Wire, 8d Common	9.368
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.868

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 10 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.58	225.71	225.71	208.90	171.92
Index in cents per lb	6.111	6.114	6.114	5.661	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$137.48	$137.75	$137.75	$128.14	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	57.00	57.00	59.67	45.23	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 10 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	4.93	4.93	4.93	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std. Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.00	5.00	5.00	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.50	4.15
Plates, Sparrow Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C. R. Chicago	6.85	6.55	6.85	6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.35	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$9.85	$9.85	$9.85	$9.45	$8.70

*Including 0.35c for special quality

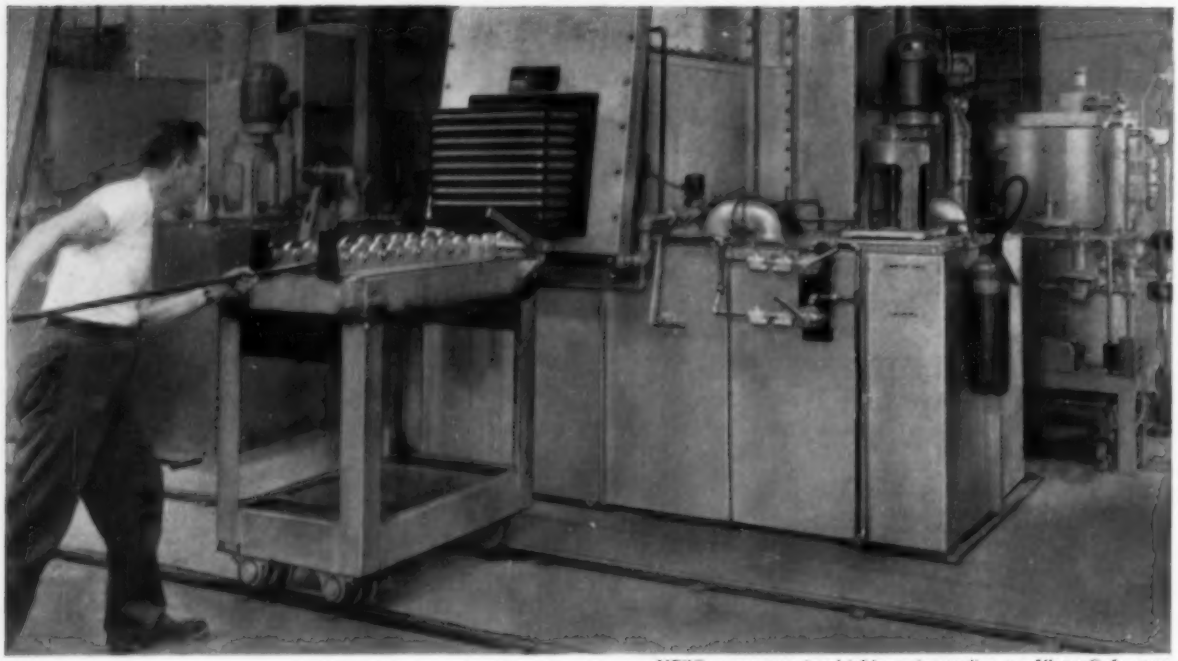
SEMIFINISHED STEEL					
Billets forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton	Oct. 10 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld. Phila.	66.26	66.26	66.26	59.16	56.61
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	59.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	235.00†	235.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$56.50	$56.50	$58.50	$44.50	$45.00
No. 1 Heavy Melt, E. Pa.	56.50	56.50	59.00	46.50	43.50
No. 1 Heavy Melt, Chicago	58.00	58.00	61.50	45.00	43.50
No. 1 Heavy Melt, Valley	64.50	64.50	65.50	48.00	45.00
No. 1 Heavy Melt, Cleve.	63.00	63.00	63.00	44.50	44.00
No. 1 Heavy Melt, Buffalo	57.50	57.50	56.50	38.50	44.00
Rails, Rerolling, Chicago	83.00	83.00	84.50	65.50	52.50
No. 1 Cast, Chicago	50.50	51.50	53.50	48.50	49.00

COKE, Net Ton					
Beehive, Furn. Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50



MRX® gas generator (right rear) supplies an Alloase® furnace

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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers page 174; to footnotes, page 176.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$70.50

INGOTS, Alloy (NT)

Detroit R7	$74.00
Houston 85	74.00
Midland,Pa. C18	74.00
Munhall,Pa. U5	74.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$74.00
Bessemer,Pa. U5	74.00
Bridgeport,Conn. N19	79.00
Buffalo R2	74.00
Clairton,Pa. U5	74.00
Ensley,Ala. T2	74.00
Fairfield,Ala. T2	74.00
Fontana,Calif. K1	83.50
Gary,Ind. U5	74.00
Johnstown,Pa. B2	74.00
Lackawanna,N.Y. B2	74.00
LoneStar,Tex. L6	80.00
Munhall,Pa. U5	74.00
Pittsburgh J5	74.00
S.Chicago,Ill. R2, U5	74.00
S.Duquesne,Pa. U5	74.00
Sterling,Ill. N15	74.00
Youngstown R2	74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5	$91.50
Bessemer,Pa. U5	91.50
Bridgeport,Conn. N19	96.50
Buffalo R2	91.50
Canton,O. R2	94.00
Clairton,Pa. U5	91.50
Conshohocken,Pa. A3	96.50
Ensley,Ala. T2	91.50
Fairfield,Ala. T2	91.50
Fontana,Calif. K1	101.00
Gary,Ind. U5	91.50
Geneva,Utah C11	91.50
Houston 85	96.50
Johnstown,Pa. B2	91.50
Lackawanna,N.Y. B2	91.50
LosAngeles B3	101.00
Midland,Pa. C18	91.50
Munhall,Pa. U5	91.50
Pittsburgh J5	91.50
Seattle B3	105.00
S.Chicago R2, U5, W14	91.50
S.Duquesne,Pa. U5	91.50
S.SanFrancisco B3	101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$107.00
Bridgeport,Conn. N19	107.00
Buffalo R2	107.00
Canton,O. R2	107.00
Conshohocken,Pa. A3	114.00
Detroit R7	107.00
Fontana,Calif. K1	128.00
Gary,Ind. U5	107.00
Houston 85	112.00
Ind.Harbor,Ind. Y1	107.00
Johnstown,Pa. B2	107.00
Lackawanna,N.Y. B2	107.00
LosAngeles B3	127.00
Massillon,O. R2	107.00
Midland,Pa. C18	107.00
Munhall,Pa. U5	107.00
S.Chicago R2,U5,W14	107.00
S.Duquesne,Pa. U5	107.00
Struthers,O. Y1	107.00
Warren,O. C17	107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19	$116.50
Buffalo R2	111.50
Canton,O. R2	114.00
Cleveland R2	111.50
Gary,Ind. U5	111.50
S.Chicago,Ill. R2, W14	111.50
S.Duquesne,Pa. U5	111.50

SKELP

Aliquippa,Pa. J5	4.725
LoneStar,Tex. L6	5.025
Munhall,Pa. U5	4.625
SparrowsPoint,Md. B2	4.625
Warren,O. R2	4.625
Youngstown R2, U5	4.625

WIRE RODS

AlabamaCity,Ala. R2	5.80
Aliquippa,Pa. J5	5.80
Alton,Ill. L1	6.00
Buffalo W12	5.80
Cleveland A7	5.80
Donora,Pa. A7	5.80
Fairfield,Ala. T2	5.80
Houston 85	6.05
IndianaHarbor,Ind. Y1	5.80
Johnstown,Pa. B2	5.80
Joliet,Ill. A7	5.80
KansasCity,Mo. S5	6.05
Kokomo,Ind. C16	5.90
LosAngeles B3	6.60
Minnequa,Colo. C10	6.05
Monessen,Pa. P7	5.80
N.Tonawanda,N.Y. B11	5.80
Pittsburg,Calif. C11	6.45
Portsmouth,O. P12	5.80
Roebling,N.J. R5	5.90
S.Chicago,Ill. R2	5.80
SparrowsPoint,Md. B2	5.90
Sterling,Ill.(1) N15	5.80
Sterling,Ill. N15	5.90
Struthers,O. Y1	5.80
Worcester,Mass. A7	6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	5.00
Aliquippa,Pa. J5	5.00
Bessemer,Ala. T2	5.00
Bethlehem,Pa. B2	5.05
Birmingham C15	5.30
Clairton,Pa. U5	5.00
Fairfield,Ala. T2	5.00
Fontana,Calif. K1	5.70
Gary,Ind. U5	5.00
Geneva,Utah C11	5.00
Houston 85	5.10
Ind.Harbor,Ind. I-2	5.00
Johnstown,Pa. B2	5.05
KansasCity,Mo. S5	5.10
Lackawanna,N.Y. B2	5.05
LosAngeles B3	5.70
Minnequa,Colo. C10	5.30
Munhall,Pa. U5	5.00
Niles,Calif. P1	5.75
Phoenixville,Pa. P4	5.85
Portland,Oreg. O4	5.80
Seattle B3	5.75
S.Chicago,Ill. U5, W14	5.00
S.SanFrancisco B3	5.65
Sterling,Ill. N15	5.00
Torrance,Calif. C11	5.70
Weirton,W.Va. W6	5.00

Wide Flange

Bethlehem,Pa. B2	5.05
Clairton,Pa. U5	5.00
Fontana,Calif. K1	5.85
IndianaHarbor,Ind. I-2	5.00
Lackawanna,N.Y. B2	5.05
Munhall,Pa. U5	5.00
Phoenixville,Pa. P4	5.85
S.Chicago,Ill. U5	5.00

Alloy Std. Shapes

Clairton,Pa. U5	6.20
Fontana,Calif. K1	7.85
Gary,Ind. U5	6.20
Houston 85	6.30
Munhall,Pa. U5	6.20
S.Chicago,Ill. U5	6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	7.35
Bessemer,Ala. T2	7.35
Bethlehem,Pa. B2	7.40
Clairton,Pa. U5	7.35
Fairfield,Ala. T2	7.35
Fontana,Calif. K1	8.05
Gary,Ind. U5	7.35
Geneva,Utah C11	7.35
Houston 85	7.45
Ind.Harbor,Ind. I-2, Y1	7.35
Johnstown,Pa. B2	7.40
KansasCity,Mo. S5	7.45
Lackawanna,N.Y. B2	7.40
LosAngeles B3	8.05
Munhall,Pa. U5	7.35
Seattle B3	8.10
S.Chicago,Ill. U5, W14	7.35
S.SanFrancisco B3	8.00
Struthers,O. Y1	7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	7.40
Ind.Harbor,Ind. I-2	7.35
Lackawanna,N.Y. B2	7.40
Munhall,Pa. U5	7.35
S.Chicago,Ill. U5	7.35

PILING

BEARING PILES

Bethlehem,Pa. B2	5.05
Lackawanna,N.Y. B2	5.05
Munhall,Pa. U5	5.00
S.Chicago,Ill. U5	5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.90
Lackawanna,N.Y. B2	5.90
Munhall,Pa. U5	5.90
S.Chicago,Ill. U5	5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Ashland,Ky. (15) A10	4.85
Bessemer,Ala. T2	4.85
Bridgeport,Conn. N19	4.75
Clairton,Pa. U5	4.85
Claymont,Del. C22	5.35
Cleveland J5, R2	4.95
Contesville,Pa. L7	5.25
Conshohocken,Pa. A3	4.90
Detroit M1	4.60
Ecorse,Mich. G5	4.95
Fairfield,Ala. T2	4.85
Fontana,Calif.(30) K1	5.55
Gary,Ind. U5	4.85
Geneva,Utah C11	4.85
GraniteCity,Ill. G4	5.05
Harrisburg,Pa. P4	5.80
Houston 85	4.95
Ind.Harbor,Ind. I-2, Y1	4.85
Johnstown,Pa. B2	4.85
Lackawanna,N.Y. B2	4.85
LoneStar,Tex. L6	5.20
Minnequa,Colo. C10	5.70
Munhall,Pa. U5	4.85
Newport,Ky. N9	4.85
Pittsburgh J5	4.85
Riverdale,Ill. A1	4.85
Seattle B3	5.75
Sharon,Pa. S3	4.85
S.Chicago,Ill. U5, W14	4.85
SparrowsPoint,Md. B2	4.85
Steubenville,O. W10	4.85
Warren,O. R2	4.85
Weirton,W.Va. W6	4.85
Youngstown R2, U5, Y1	4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	6.20
Fontana,Calif. K1	6.70
Geneva,Utah C11	6.00
Johnstown,Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	7.25
Bessemer,Ala. T2	7.25
Clairton,Pa. U5	7.25
Claymont,Del. C22	7.85
Cleveland J5, R2	7.25
Coatesville,Pa. L7	7.55
Conshohocken,Pa. A3	7.25
Ecorse,Mich. G5	7.35
Fairfield,Ala. T2	7.25
Fontana,Calif.(30) K1	7.95
Gary,Ind. U5	7.25
Geneva,Utah C11	7.25
Houston 85	7.35
Ind.Harbor,Ind. I-2, Y1	7.25
Johnstown,Pa. B2	7.25
Munhall,Pa. U5	7.25
Pittsburgh J5	7.25
Seattle B3	8.15
Sharon,Pa. S3	7.25
S.Chicago,Ill. U5, W14	7.25
SparrowsPoint,Md. B2	7.25
Warren,O. R2	7.25
Youngstown U5, Y1	7.25

PLATES, Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.85
Coatesville,Pa. L7	6.85
Fontana,Calif.(30) K1	7.55
Gary,Ind. U5	6.85
Houston 85	6.95
Ind.Harbor,Ind. Y1	6.85
Johnstown,Pa. B2	6.85
Munhall,Pa. U5	6.85
Newport,Ky. N9	6.85
Seattle B3	7.75
Sharon,Pa. S3	6.85
S.Chicago,Ill. U5, W14	6.85
SparrowsPoint,Md. B2	6.85
Youngstown Y1	6.85

FLOOR PLATES

Cleveland J5	5.925
Conshohocken,Pa. A3	5.925
Harrisburg,Pa. P4	6.275
Ind.Harbor,Ind. I-2	5.925
Munhall,Pa. U5	5.925
S.Chicago,Ill. U5	5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10	5.10
Ashland l.c.l. (15) A10	5.60
Cleveland c.l. R2	5.60
Warren,O. c.l. R2	5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2	5.075
Aliquippa,Pa.(9) J5	5.075
Alton,Ill. L1	5.275
Atlanta(9) A11	5.075
Bessemer,Ala.(9) T2	5.075
Birmingham(9) C15	5.375
Bridgeport,Conn. N19	5.50
Buffalo(9) R2	5.075
Clairton,Pa. U5	5.075
Cleveland(9) R2	5.075
Ecorse,Mich.(9) G5	5.175
Emeryville,Calif. J7	5.85
Fairfield,Ala.(9) T2	5.075
Fairless,Pa.(9) U5	5.225
Fontana,Calif.(9) K1	5.775
Gary,Ind.(9) U5	5.075
Geneva(9) C11	5.175
Houston(9) 85	5.325
Ind.Harbor(9) I-2, Y1	5.075
Johnstown,Pa.(9) B2	5.075
Joliet,Ill. P22	5.575
KansasCity,Mo.(9) 85	5.325
Lackawanna(9) B2	5.075
LosAngeles(9) B3	5.775
Midland,Pa.(9) C18	5.425
Milton,Pa.(23) M18	5.425
Minnequa,Colo. C10	5.525
Niles,Calif. P1	5.85
N.Tonawanda,N.Y.(9) B11	5.075
Pittsburg,Calif.(9) C11	5.775
Pittsburgh(9) J5	5.075
Portland,Oreg. O4	5.85
Seattle B3, N14	5.825
S.Ch'e'go(9) R2,U5,W14	5.075
S.Duquesne,Pa.(9) U5	5.075
S.SanFran.,Calif.(9) B3	5.825
Sterling,Ill.(1) N15	5.075
Sterling,Ill. N15	5.175
Struthers,O. Y1	5.075
Torrance,Calif.(9) C11	5.775
Weirton,W.Va.(9) W6	5.075
Youngstown(9) R2, U5	5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17	7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	6.125
Bridgeport,Conn. N19	6.20
Buffalo R2	6.125
Canton,O. R2	6.125
Clairton,Pa. U5	6.125
Detroit R7	6.125
Ecorse,Mich. G5	6.225
Fairless,Pa. U5	6.275
Fontana,Calif. K1	7.175
Gary,Ind. U5	6.125
Houston 85	6.375
Ind.Harbor,Ind. I-2, Y1	6.125
Johnstown,Pa. B2	6.125
KansasCity,Mo. S5	6.375
Lackawanna,N.Y. B2	6.125
LosAngeles B3	7.175
Massillon,O. R2	6.125
Midland,Pa. C18	6.125
S.Chicago R2, U5, W14	6.125
S.Duquesne,Pa. U5	6.125
Struthers,O. Y1	6.125
Warren,O. C17	6.125
Youngstown U5	6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	7.425
Bessemer,Ala. T2	7.425
Bethlehem,Pa. B2	7.425
Bridgeport,Conn. N19	7.50
Clairton,Pa. U5	7.425
Cleveland R2	7.425
Ecorse,Mich. G5	7.525
Fairfield,Ala. T2	7.425
Fontana,Calif. K1	8.125
Gary,Ind. U5	7.425
Houston 85	7.675
Ind.Harbor,Ind. Y1	7.425
Johnstown,Pa. B2	7.425
KansasCity,Mo. S5	7.675
Lackawanna,N.Y. B2	7.425
LosAngeles B3	8.125
Pittsburgh J5	7.425
Seattle B3	8.175
S.Chicago U5, W14	7.425
S.Duquesne,Pa. U5	7.425
S.SanFrancisco B3	8.175
Struthers,O. Y1	7.425
Youngstown U5	7.425

BAR SIZE ANGLES, H.R. Carbon

Bethlehem,Pa.(9) B2	5.225
Lackawanna(9) B2	5.075
Sterling,Ill. N15	5.175
Sterling,Ill.(1) N15	5.075

BAR SIZE ANGLES, S. Shapes

Aliquippa,Pa. J5	5.075
Atlanta A11	5.575
Fontana,Calif. K1	5.35
Joliet,Ill. P22	5.10
Niles,Calif. P1	5.85
Pittsburgh J5	5.075
Portland,Oreg. O4	5.85
SanFrancisco B7	5.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	6.20
Gary,Ind. U5	6.20
GreenBay,Wis. F7	6.45
KansasCity,Mo. S5	6.45
Youngstown U5	6.20

BARS, C.F. Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18	9.225
Chicago W18	9.225
Cleveland C20	9.475
LosAngeles S30	11.10
LosAngeles P2	11.00
Monaca,Pa. S17	9.225
Newark,N.J. W18	9.40
Warren,O. C17	9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	6.85
BeaverFalls,Pa. M12,R2	6.85
Bridgeport,Conn. N19	7.20
Buffalo B5	6.90
Camden,N.J. P13	7.30
Carnegie,Pa. C12	6.85
Chicago W18	6.85
Cleveland A7, C20	6.85
Detroit B5, P17	7.05
Detroit R7	6.85
Donora,Pa. A7	6.85
Elyria,O. W8	6.85
FranklinPrk,Ill. N5	6.85
Gary,Ind. U5	6.85
GreenBay,Wis. F7	6.85
Hammond,Ind. L2, M13	6.85
Hartford,Conn. R2	7.35
Harvey,Ill. B5	6.85
LosAngeles(49) S30	8.30
LosAngeles P2, R2	8.30
Mansfield,Mass. B5	7.40
Massillon,O. R2, R8	6.85
Midland,Pa. C18	6.85
Monaca,Pa. S17	6.85
Newark,N.J. W18	7.30
NewCastle,Pa.(17) B4	6.85
Pittsburgh J5	6.85
Plymouth,Mich. P5	7.10
Putnam, Conn. W18	7.40
Readville,Mass. C14	7.40
S.Chicago,Ill. W14	6.85
SpringCity,Pa. K3	7.30
Struthers,O. Y1	6.85
Waukegan,Ill. A7	6.85
Youngstown F3, Y1	6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19	8.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	8.325
BeaverFalls,Pa. M12,R2	8.325
Bethlehem,Pa. B2	8.325
Bridgeport,Conn. N19	8.475
Buffalo B5	8.325
Camden,N.J. P13	8.50
Canton,O. T7	7.425
Carnegie,Pa. C12	8.325
Chicago W18	8.325
Cleveland A7, C20	8.325
Detroit B5, P17	8.525
Detroit R7	8.325
Donora,Pa. A7	8.325
Elyria,O. W8	8.325
FranklinPark,Ill. N5	8.325
Gary,Ind. R2	8.325
GreenBay,Wis. F7	8.325
Hammond,Ind. L2,M13	8.325
Hartford,Conn. R2	8.625
Harvey,Ill. B5	8.325
Lackawanna,N.Y. B2	8.325
LosAngeles P2, S30	10.10
Mansfield,Mass. B5	8.625
Massillon,O. R2, R8	8.325
Midland,Pa. C18	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
Plymouth,Mich. P5	8.525
S.Chicago W14	8.325
SpringCity,Pa. K3	8.50
Struthers,O. Y1	8.325
Warren,O. C17	8.325
Waukegan,Ill. A7	8.325
Worcester,Mass. A7	8.625
Youngstown F3, Y1	8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	5.075
Atlanta A11	5.575
Birmingham C15	5.375
Bridgeport,Conn. N19	5.30
Buffalo R2	5.075
Cleveland R2	5.075
Ecorse,Mich. G5	5.425
Emeryville,Calif. J7	5.85
Fairfield,Ala. T2	5.075
Fairless,Pa. U5	5.225
Fontana,Calif. K1	5.80

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .....5.075
Houston B5 .....5.325
Ind.Harbor,Ind. I-2 Y1 5.075
Johnstown,Pa. B2 .....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. B5 .....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SandSprings,Okla. B5..5.575
Seattle B3, N14 .....5.825
S.Chicago R2 .....5.075
S.Duquesne,Pa. U5 .....5.075
S.SanFrancisco B3 ..5.825
SparrowsPoint,Md. B2 5.075
Sterling,Ill.(1) N15 ....5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ....5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Kans. B5 ..6.825
Marion,O. P11 .....6.70
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ⅛-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 ....5.075
ChicagoHts.(4) C2 .....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(4) F5 ....5.60
Franklin,Pa.(3) F5 ....5.10
JerseyShore,Pa.(4) J8 . 5.00
Marion,O.(3) P11 .....5.15
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19 5.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 12.306
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
McK.Rks.(S.R.) L5 ..12.306
McK.Rks.(D.R.) L5 ..16.00
McK.Rks.(Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Dravosburg,Pa. U5....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 ....4.775
GraniteCity,Ill.(8) G4..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) N9 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburg J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.6.5
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ...4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Dravosburg,Pa. U5 ....5.75
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 .....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ...6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 .5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1.....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Dravosburg U5	6.65	6.90
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
Ind Harbor I-2	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg U5 .....6.90
Gary,Ind. U5 .....6.90
Ind Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30‡
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30‡
Dravosburg,Pa. U5 ..6.30‡
Fairfield,Ala. T2 .....6.30‡
Gary,Ind. U5 .....6.30‡
GraniteCity,Ill. G4 ....6.50‡
Ind.Harbor,Ind. I-2 ..6.30‡
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30‡
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30‡
SparrowsPt.,Md. B2 ..6.30‡
Warren,O. R2 .....6.30‡
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ...9.275
SparrowsPoint(39) B2. 9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyshoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest SteelRoll.Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg U5	7.75
Fontana Calif. K1	9.65
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.95
Fairfield,Ala. T2	6.95
Fontana,Calif. K1	8.025
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
Lackawanna,N.Y. B2	6.25
LosAngeles CI	*8.80*
NewBedford Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	10.00

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	...
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	...
Dearborn,Mich. D3	8.05	9.90	12.70	...	...
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	...
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	...
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	...
NewYork W3	...	10.10	12.90	15.30	18.25
Pawtucket R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	16.80	20.65	...
Buffalo W12	16.80	...	...
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	...	...
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. W12	14.80	...	...
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	...
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	...
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville A10 (SP coils)	...	...	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	...
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	...
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	...	...	...
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge Pa. A4	...	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	...	...	18.50	19.00	19.50	...
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	...	...	...	...	...	14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fairless,Pa. U5	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	...	...
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Harbor Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15

SparrowsPoint,Md. B2	7.50
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7 P16	7.20
N.Tonawanda B11	7.20
Palmer-Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth,Minn. A7	8.725
Fostoria,O. S1	8.775
Johnstown Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.825
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester,Mass. J4	9.025
Worcester,Mass. A7, T6	9.025

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth Minn. A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	13.55
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE, Gal'd ACSR for Cores

Bartonville Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

BARE WIRE	(A)
Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.35
Roebling,N.J. R5	11.85
SparrowsPt. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	....15.25
Monessen,Pa. P16	....14.45
Roebling,N.J. R5	....14.35

WIRE, Cold-Rolled Flat

Anderson Ind. G6	....10.75
Baltimore T6	....11.05
Boston T6	....11.05
Buffalo W12	....10.75
Cleveland A7	....10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	....10.75
Fostoria,O. 81	....10.75
FranklinPark Ill. T6	..10.85
Kokomo,Ind. C16	....10.75
Massillon,O. R8	....10.75
Milwaukee C23	....10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	....11.05
Pawtucket,R.I. N8	....11.05
Riverdale,Ill. A1	....10.85
Rome,N.Y. R6	....10.75
Trenton,N.J. R5	....11.05
Worcester A7, T6	....11.05

NAILS, Stock

To Dealers & Mfrs.	Col.
AlabamaCity,Ala. R2	*164*
Al'quippa,Pa. (7) J5	167
Atlanta (7) A11	169
Bartonville,Ill. (7) K4	..169
Chicago Ill. (7) W13	167
Cleveland (7) A9	173
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth,Minn. A7	164
Fairfield,Ala. T2	164
Houston,Tex.(7) 85	172
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. (7) B2	..169
Joliet,Ill. A7	164
KansasCity,Mo. (7) 85	..172
Kokomo,Ind. (7) C16	..169
Minnequa,Colo. (7) C10	..172
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	*164*
SparrowsPt.,Md.(7) B2	169
Sterling,Ill. (1) (7) N15	167
Worcester,Mass. A7	170

(To Wholesalers; per cwt)

Galveston,Tex D7	....$8.75

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken Pa. A3	..$9.80
Wheeling,W Va. W10	..9.80

STAPLES, Polished Stock

To Dealers & Mfrs.	Col.
AlabamaCity,Ala. R2	*164*
Al'quippa,Pa. (7) J5	167
Atlanta (7) A11	169
Bartonville,Ill. (7) K4	..169
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth,Minn. A7	164
Fairfield,Ala. T2	164
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. (7) B2	..169
Joliet,Ill. A7	164
Kokomo,Ind. (7) C16	..169
Minnequa,Colo. (7) C10	..172
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	*164*
SparrowsPt.,Md.(7) B2	169
Sterling,Ill. (1) (7) N15	167
Worcester,Mass. A7	170

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	*$9.51*
Bartonville,Ill. K4	....10.13
Buffalo W12	....10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	*9.51*
Duluth,Minn. A7	*9.51*
Jacksonville,Fla. M8	..10.58
Johnstown,Pa. B2	....10.03
Joliet,Ill. A7	*9.51*
Kokomo,Ind. C16	....10.13
LosAngeles B3	....10.82
Minnequa,Colo. C10	..10.28
Pittsburg,Calif. C11	*10.31*
S.Chicago,Ill. R2	*9.51*
S.SanFrancisco C10	....10.81
SparrowsPt., Md. B2	..10.13
Sterling,Ill. N15	....10.03

Coil No. 8500 Stand.	
AlabamaCity,Ala. R2	*$9.85*
Bartonville,Ill. K4	....10.45
Buffalo W12	....10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	*9.85*
Duluth,Minn. A7	*9.85*
Jacksonville,Fla. M8	..10.91
Johnstown, Pa.B2	....10.35
Joliet,Ill. A7	*9.85*
Kokomo,Ind. C16	....10.45
LosAngeles B3	....11.15
Minnequa,Colo. C10	..10.60
Pittsburg,Calif. C11	*10.65*
S.Chicago,Ill. R2	*9.85*
S.SanFrancisco C10	....11.15
SparrowsPt.,Md. B2	..10.45
Sterling,Ill. N15	....10.35

Coil Interim	
AlabamaCity,Ala. R2	*$9.90*
Bartonville,Ill. K4	....10.50
Buffalo W12	....10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	*9.90*
Duluth,Minn. A7	*9.90*
Jacksonville,Fla. M8	..10.96
Johnstown Pa. B2	....10.40
Joliet, Ill. A7	*9.90*
Kokomo,Ind. C16	....10.50
LosAngeles B3	....11.20
Minnequa,Colo. C10	..10.65
Pittsburg,Calif. C11	*10.70*
S.Chicago,Ill. R2	*9.90*
S.SanFrancisco C10	..11.20
SparrowsPt.,Md. B2	..10.50
Sterling,Ill. N15	....10.40

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	*184***
Aliqu.ppa,Pa. J5	....184‡
Atlanta A11	193
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	..193
Donora,Pa. A7	....184†
Duluth,Minn. A7	....184†
Fairfield,Ala. T2	....184†
Houston,Tex. 85	....192**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	....191*
Joliet,Ill. A7	....184†
KansasCity,Mo. 85	....192**
Kokomo,Ind. C16	....189†
Minnequa,Colo. C10	..192**
Monessen,Pa. P7	....191*
Pittsburg Calif. C11	....204†
Rankin,Pa. A7	....184†
S.Chicago,Ill. R2	*184***
S.SanFrancisco C10	..207**
SparrowsPoint,Md., B2	..193*
Sterling,Ill. (1) N15	..191*

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	....181**
Aliq'ppa,Pa. 9-14½ga.J5	184‡
Atlanta A11	187
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	.187
Donora,Pa. A7	....176†
Duluth,Minn. A7	....176†
Fairfield,Ala. T2	....176†
Houston,Tex. 85	....186**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	..185
Joliet,Ill. A7	....176†
KansasCity,Mo. 85	....186**
Kokomo,Ind. C16	....183†
Minnequa,Colo. C10	..186**
Monessen,Pa. 9 ga. P7	185*
Pittsburg Calif. C11	....199†
Rankin,Pa. A7	....176†
S.Chicago,Ill. R2	*176***
Sterling,Ill.(1) N15	....185*

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	*15.70*	*17.25***
Bartonville K4	..16.10	18.05
Buffalo W12	....16.10	....
Cleveland A7	*15.70*	*17.25†*
Crawf'dsville M8	16.20	18.15
Fostoria,O. 81	..16.20	17.75†
Jacksonville M8	..16.45	18.40
Johnstown B2	..16.10	18.05*
Kokomo C16	..16.20	17.75†
Minnequa C10	..16.45	18.15**
P'lm'r,Mass.W12	16.10	17.65*
Pitts.,Calif. C11	*16.05*	*17.60†*
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	*15.70*	*17.25†*
Worcester A7	*16.00*	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	*7.95*	*8.75***
Aliquippa J5	....8.10	8.625‡
Atlanta A11	....8.20	8.80
Bartonville(48)	K4 8.20	8.80
Buffalo W12	....8.10	8.50†
Cleveland A7	....7.95	....
Crawfordsville M8	.8.20	8.80
Donora,Pa. A7	..7.95	8.35†
Duluth,Minn. A7	..7.95	8.35†
Fairfield T2	....7.95	8.35†
Houston(48) 85	8.35	8.75**
Jacks'ville,Fla. M8	8.45	9.05
Johnstown B2(48)	8.10	8.70*
Joliet,Ill. A7	....7.95	8.35†
Kans.City(48) 85	8.35	8.75**
Kokomo C16	....8.20	8.60†
LosAngeles B3	..9.05	9.65*
Minnequa C10	..8.35	8.75**
Monessen P7 (48)	8.10	8.70*
Palmer Mass. W12	8.40	8.80†
Pitts.,Calif. C11	..8.90	9.30†
Portsmouth,O.	P12 8.10	....
Rankin Pa. A7	..7.95	8.35†
S.Chicago R2	*7.95*	*8.75***
S.SanFran. C10	..9.05	9.45**
Spar'wsPt. B2(48)	8.20	8.80*
Sterling(1)(48)N15	8.10	8.70*
Struth'rs,O.(48)	Y1 8.10	8.60‡
Worcester,Mass. A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. ‡10c. ‡‡Less than 10c. †††3c. **Subject to zinc equalization extras.

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	*190*
Atlanta A11	197
Bartonville Ill. K4	197
Crawfordsville,Ind. M8	..197
Donora,Pa. A7	190
Duluth,Minn. A7	190
Fairfield,Ala. T2	190
Jacksonville,Fla. M8	...202
Joliet,Ill. A7	190
Houston 85	200
KansasCity,Mo. 85	200
Kokomo,Ind. C16	197
Minnequa,Colo. C10	200
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	*190*
Sterling,Ill. N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	...175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	..167
Duluth,Minn. A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	..169
Johnstown Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Moline,Ill. R2	172
S.Chicago Ill. R2	167
Sterling,Ill. N15	167
Tonawanda,N.Y. B12	..169
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	55
Longer than 6 in.	46.5
⅝ in. thru 1 in.:	
6 in. and shorter	46.5
Longer than 6 in.	44
1⅛ and larger:	
All lengths	44

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	55

Carriage, Machine Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	35
Longer than 6 in.	23
⅝ in thru 1 in.:	
6 in. and shorter	20
Longer than 6 in.	20
1⅛ in. and larger:	
All lengths	20

Lag Bolts
All diameters:

6 in. and shorter	55
Longer than 6 in.	47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	54
Larger than ½ in. or longer than 6 in.	47

Blank Bolts 47
Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:
All sizes 59

Square Nuts, Reg. & ..
Heavy, Hot Galvanized: ....
All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:

⅜ in. and smaller	63
⅜ in. to 1 in. incl.	59.5
1⅛ in. to 1½ in., incl.	64
1⅝ in. and larger	58

Hex Nuts, Reg. & Heavy, Cold Punched:

⅜ in. and smaller	63
⅜ in. to 1⅛ in., incl.	59.5
1⅛ in. and larger	58

Hex Nuts, All Types, Hot Galvanized:

⅜ in. and smaller	50
⅜ in. to 1 in., incl.	46
1⅛ in. to 1½ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. slotted):

⅜ in. and smaller	63
⅜ in. to 1⅛ in., incl.	59.5
1⅛ in. and larger	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	65
1⅛ in. to 1½ in., incl.	62
1⅝ in. and larger	58

(Base discounts, packages, per cent off list, f.o.b. mill)

CAP AND SET SCREWS

Hex Head Cap Screws, Coarse or Fine Thread
Bright:
6 in. and shorter:

⅝ in. and smaller	47
¾, ⅞, and 1 in., diam.	31

Longer than 6 in.:

⅝ in. and smaller	18.5
¾, ⅞ and 1 in. diam.	55

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	34
¾, ⅞ and 1 in. diam.	13

Longer than 6 in.:

⅝ in. and smaller	+1
¾, ⅞ and 1 in. diam.	+19

Fillister Head, Coarse Thread:
Listed Sizes ....+31

Flat Head, Coarse Head:
¼ in. and smaller by 6 in. and shorter ..+67

Set Screws, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter .. 11
Longer than 6 in. ..+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 10.85
⅞-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.88	25.08
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2¾	12	46.98	55.01	44.73
2½	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All 60 lb No. 2	Tee Rails All 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	....(16)6.00	
Lackawanna,N.Y. B2	5.075	4.975	....(16)6.00	
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	....6.025
Gary,Ind. U5	....6.025
Ind.Harbor,Ind I-2	...6.025
Lackawanna,N.Y. B2	..6.025
Minnequa Colo. C10	...6.025
Seattle B3	....6.175
Steelton,Pa. B2	....6.025
Torrance,Calif. C11	...6.175

TRACK BOLTS, Untreated

Cleveland R2	....13.10
Lebanon,Pa. B2	....13.10
Minnequa,Colo. C10	...13.10
Pittsburgh P14	....13.10
Seattle B3	....13.60

AXLES

Ind.Harbor,Ind. S13	....8.10
Johnstown,Pa. B2	....8.10

JOINT BARS

Bessemer,Pa. U5	....6.35
Fairfield, Ala. T2	....6.35
Ind.Harbor,Ind. I-2	...6.35
Joliet,Ill. U5	....6.35
Lackawanna,N.Y. B2	..6.35
Minnequa,Colo. C10	...6.35
Steelton,Pa. B2	....6.35

SCREW SPIKES

Cleveland R2	....12.85
Pittsburgh P14	....12.85

STANDARD TRACK SPIKES

Fairfield Ala. T2	...8.775
Ind.Harbor,Ind I-2, Y1	8.775
KansasCity,Mo. 85	...8.775
Lebanon,Pa. B2	....8.775
Minnequa Colo. C10	...8.775
Pittsburgh J5	....8.775
Seattle B3	....9.275
S.Chicago,Ill. R2	....8.775
Struthers,O. Y1	....8.775
Youngstown R2	....8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 0.25c; 1 15/16 to 8 in., inclusive, 0.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Plate only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.625c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅜-in.; 7.20c, for widths ⅜-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 84" and narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.025"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.625c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 2½-in. and smaller rounds; 0.65c, over 2½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.16	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		8c		9c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+15	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Wheatland, Pa. W9	18	+12.5	9.5	+15	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	....	35.75	37.25	29.25	41.25	45.25	45.25
301	20.50	25.25	33.75	....	34.00	38.25	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	....	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	....	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	....	41.50	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	....	39.75	40.75	43.00	45.75	50.25	50.25
304L	....	....	43.00	....	46.75	48.25	50.25	53.25	57.75	57.75
305	24.75	32.50	37.75	....	43.00	40.75	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	....	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	....	58.50	57.50	60.50	64.25	73.50	73.50
310	42.50	53.75	69.00	....	75.50	77.50	81.50	83.25	87.00	87.00
314	....	....	....	....	....	77.50	....	83.25	....	....
316	35.25	44.50	56.25	....	63.50	63.50	66.75	70.25	74.75	74.75
316L	....	....	62.75	....	70.00	71.00	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	....	81.50	79.50	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	....	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	....	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	....	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	....	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	....	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	....	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	....	56.75	42.50	44.75	46.00	67.25	80.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div. Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates 15%	Plates 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	33.25
304	....	34.50	....	41.50	35.25
304-L	....	37.20	....	44.65	....
316	....	38.70	....	46.65	52.25
316-L	....	45.70	....	54.35	....
316-CB	....	45.90	....	54.75	....
321	....	36.35	....	43.40	42.00
347	....	39.50	....	48.45	51.00
405	....	29.20	....	37.05	....
410	....	28.70	....	36.55	....
430	....	28.70	....	36.55	....
Inconel	45.70	54.80	63.85	73.00	....
Nickel	37.95	46.25	54.60	62.95	....
Nickel, Low Carbon	38.25	46.90	55.60	64.40	....
Monel	40.30	49.10	57.95	66.80	....
Copper*	....	....	....	....	48.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.60	41.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.170
18.25	4.25	1	4.75	....	....	2.385
18	4	2	9	....	....	2.7575
18	4	2	....	....	....	1.845
18	4	1	....	....	....	1.680
9	3.5	..	....	....	....	1.275
13.5	4	3	....	....	....	1.945
13.75	2.75	2	5	....	....	2.325
6.4	4.5	1.9	....	5	....	1.185
6	4	3	....	6	....	1.430
1.5	4	1	....	8.5	....	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld	....	66.79	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	66.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.80	65.30	65.30	65.80
Muskegon,Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
New York, deld.	....	69.01	69.51	....
Newark, deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
Neville Island,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks, deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	64.76	64.76	65.29
Verona, Trafford deld.	64.79	65.32	65.32	65.85
Brackenridge, deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Texas L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	102.00
Keokuk, O.H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	105.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Neville Island,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09[3]	15.69	8.57	8.13	9.56
Birmingham	7.65‖	8.85‖	8.55‖	....	7.75	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	10.92	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.96
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.83	8.89	9.70	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.15	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60[10]	....	7.90	8.00	8.65	8.70[10]	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.70	15.00	9.40	9.10	10.60
Jackson, Miss.	8.00‖	9.20‖	9.22‖	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.37
Moline, Ill.	7.48	8.59	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	8.35	9.53	10.23	57.73	8.51	8.83	9.38	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.36	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
	8.29	9.49	10.31	....	8.39	8.52	...	9.21	14.60	8.75	8.71	11.60
Richmond, Va.	8.05	...	10.00	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.50
St. Paul	7.93	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	11.20	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	11.35	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.70	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‖includes 35-cent bar quality extras; **½-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43; ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$32.50-32.60
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U.S. ports, duty for buyer's account; 46-47%, $1.10-1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 3:1	$52.00-53.50
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$35.00-36.00
44% no ratio	25.00-26.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
Swedish, c.i.f., Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b. Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	24.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, $6.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb. drum frght, allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	58.50-48.25†
Bronze, 5000-lb lots	59.50-63.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.00-61.00†
Phosphor-Copper, 5000-lb lots	65.00
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb.	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **84% Cu, 16% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.85
17	60	11.85
17	72	11.40
20	84	11.25
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.25-14.75
Connellsville, foundry	17.00-18.00

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O. ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Sweetland, Pa. ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.30	$7.30	$7.30	$7.70
Bar Size Angles	7.11	7.11	7.11	7.51
Structural Angles	7.50	7.50	7.50	7.90
I-Beams	7.75	7.75	7.75	8.15
Plates	*9.35*	*9.35*	*9.35*	*9.75*
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*27.42*	*27.42*	*27.42*	*11.38*
Barbed Wire (†)	*6.61*	*6.61*	*6.61*	*6.96*
Merchant Bars	7.30	7.30	7.30	7.70
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 5	*6.18*	*6.18*	*6.18*	*6.78*
Wire Rods, O-H Cold Heading Quality No. 5	*6.72*	*6.72*	*6.72*	*7.12*
Bright Common Wire Nails	*8.15*	*8.15*	*8.15*	*8.45*

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton Pa. 21-23% Mn, $102; 19-21% Mn, 1-3% Si, $99.50; 16-19% Mn, $97.50

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $235, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 33.75c per lb of contained Mn, carload packed 35.05c, ton lots 36.55c, less ton 37.75c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 24.15c per lb of contained Mn, packed, carload 24.45c, ton lot 27.05c, less ton 28.25c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, 37.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.95c per lb of alloy. Packed, c.l. 14.15c, ton 14.60c, less ton 15.6c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 8c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 29.85c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lots $1.31; less ton lots $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max., C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si. Packed, c.l. 16c, ton lot 17.45c; less ton 19.1. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton, 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.5c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing 2 lb of Cr). Contract carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13.9c per lb of briquet, c.l. packed, pallets 14.1c bags 15.1c; 3000 lb to c.l., pallets 15.3c; 2000 lb to c.l. bags, 16.3c, less ton 17.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 14.4c per lb of briquet, c.l. packed, pallets, 14.6c; bags 15.6c, 3000 lb to c.l., pallets, 15.8c; 2000 lb to c.l., bags 16.8c; less ton 17.7c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.55c per lb of briquet, packed, pallets, 7.75c; bags 8.75c; 3000 lb to c.l., pallets 9.35c; 2000 lb to c.l. bags 10.35c; less ton 11.25c. Delivered. Spot, add 0.25c. (Small size—Weighing approx. 2¼ lb and containing 1 lb of Si). Carload, bulk 7.7c. Packed, pallets 7.9c; bags 8.9c; 3000 lb to c.l. pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lots $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ¼-in. x 12 M, 19c per lb of alloy, ton lots 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lots 20.15c; less ton lots 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis..

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lots 19.55c; less ton lots 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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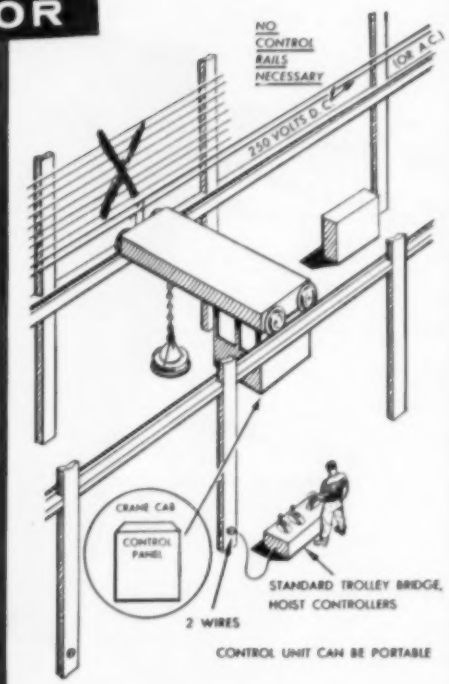

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Scrap Marks Time on High Plateau

Price decline of recent weeks slows down. Market undertone firm in absence of large new mill buying. Capacity steelmaking operations provide strong support

Scrap Prices, Page 184

Pittsburgh — Scrap prices are firm. The outlook is for continued strong demand through the winter, which will probably prevent prices from declining. All major buyers of No. 1 heavy melting filled their needs in recent purchases.

The most recent railroad scrap lists saw a dip in price for No. 1 railroad heavy melting, which sold for $66.

Cleveland—A heavy volume of scrap is moving to mills in this area on old orders, but no new buying is reported. The market is considered firm with No. 1 heavy melting $62.50-$63.50, which was the range quoted on the last representative sale about ten days ago.

Philadelphia—Steel scrap prices have steadied, with improved export demand a factor. Shipments from this port in October will likely be the heaviest in months. Two cargoes are being loaded, and two more are expected to be moved before the end of the month.

The only change in steel scrap prices is an advance in short shoveling turnings to $44-$45, delivered. Cast grades are stronger.

New York — Brokers' buying prices have held unchanged for the second consecutive week. Supply and demand appear to be in balance, although the undertone is stronger in the light of still heavier demand for finished steel and well sustained inquiry from foreign scrap buyers. Prices for cast, as well as steel scrap, continue firm. Contributing to this situation are foundry operations at close to 100 per cent of normal.

Boston—No. 1 heavy melting steel scrap prices have leveled off, although No. 2, including bundles, are off 50 cents from those a week ago. For district shipment and export, dock, No. 1 heavy melting is slightly stronger than for eastern Pennsylvania shipment. No. 1 and mixed cupola cast are slightly firmer.

Chicago—Although the scrap market has been decidedly slow during the past week with mill acquisitions of melting material limited, the downward trend of prices seems to have been halted. One important consumer, continues to post prices which are identical with those made in purchases a week to ten days ago. Scrap on old orders at higher prices is flowing to mills in substantial volume, and the real test of the market probably won't come until these commitments are out of the way.

Youngstown—Scrap prices are firm. One major consumer bought No. 1 heavy melting at $65. Bundles are going at $64. Last sales of No. 2 scrap were at $50. No. 2 bundles moved at $47.

(*Please turn to page* 189)

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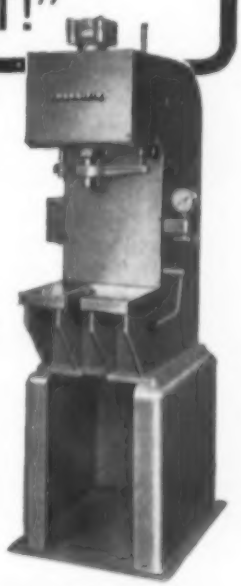

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 10	$57.00
Oct. 3	57.00
Sept. Avg.	59.08
Oct. 1955	45.17
Oct. 1951	43.60

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	*49.00-50.00*
No. 1 bundles	56.00-57.00
No. 2 bundles	*46.00-47.00*
No. 1 busheling	56.00-57.00
Machine shop turnings	38.00-39.00
Mixed borings, turnings	38.00-39.00
Short shovel turnings	42.00-43.00
Cast iron borings	42.00-43.00
Cut structurals, 3 ft lengths	67.00-68.00
Heavy turnings	53.00-54.00
Punchings & plate scrap	67.00-68.00
Electric furnace bundles	67.00-68.00

Cast Iron Grades

No. 1 cupola	54.00-55.00
Heavy breakable cast	49.00-50.00
Unstripped motor blocks	36.00-37.00
No. 1 machinery cast	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt	*65.00-66.00*
Rails, 2 ft and under	78.00-79.00
Rails, 18 in. and under	79.00-80.00
Rails, random lengths	75.00-76.00
Railroad specialties	*72.00-73.00*

Stainless Steel Scrap

18-8 bundles & solids	*410.00-450.00*
18-8 turnings	*320.00-330.00*
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	62.50-63.50
No. 2 heavy melting	44.00-45.00
No. 1 bundles	62.50-63.50
No. 2 bundles	40.00-41.00
No. 1 busheling	62.50-63.50
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Cut foundry steel	*58.00-59.00*
Low phos.	62.50-63.50
Cut structural plates 2 ft and under	68.00-69.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	62.50-63.50

Cast Iron Grades

No. 1 cupola	57.00-58.00
Charging box cast	50.00-51.00
Heavy breakable cast	48.00-49.00
Stove plate	54.00-55.00
Unstripped motor blocks	36.00-37.00
Brake shoes	44.00-45.00
Clean auto cast	56.00-57.00
Burnt cast	43.00-44.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-66.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	83.00-84.00
Rails, 18 in. and under	84.00-85.00
Rails, random lengths	80.00-81.00
Cast steel	69.00-70.00
Railroad specialties	74.00-75.00
Uncut tires	73.00-74.00
Angles, splice bars	75.00-76.00
Rails, rerolling	82.00-83.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	380.00-390.00
18-8 turnings	250.00-260.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	64.00-65.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	64.00-65.00
No. 2 bundles	43.00-44.00
No. 1 busheling	64.00-65.00
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	65.00-66.00
Electric furnace bundles	64.00-65.00

Railroad Scrap

No. 1 R.R. heavy melt.	66.00-67.00

CHICAGO

No. 1 heavy melting	56.00-60.00
No. 2 heavy melting	46.00-47.00
No. 1 factory bundles	63.00-64.00
No. 1 dealer bundles	56.00-57.00
No. 2 bundles	43.00-44.00
No. 1 busheling	56.00-60.00
Machine shop turnings	36.00-37.00
Mixed borings, turnings	37.00-38.00
Short shovel turnings	37.00-38.00
Cast iron borings	37.00-38.00
Cut structurals, 3 ft	66.00-67.00
Punchings & plate scrap	67.00-68.00

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Stove plate	*46.00-47.00*
Unstripped motor blocks	*39.00-40.00*
Clean auto cast	*55.00-56.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt	62.00-63.00
R.R. malleable	*70.00-71.00*
Rails, 2 ft and under	81.00-82.00
Rails, 18 in. and under	82.00-83.00
Angles, splice bars	73.00-74.00
Rails, rerolling	82.00-84.00

Stainless Steel Scrap

18-8 bundles & solids	450.00-470.00
18-8 turnings	350.00-370.00
430 bundles & solids	70.00-75.00
430 turnings	52.50-57.50

DETROIT

Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	55.00
No. 2 heavy melting	*41.00*
No. 1 bundles	56.00
No. 2 bundles	*37.00*
No. 1 busheling	55.00
Machine shop turnings	30.00
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	60.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	22.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 R.R. heavy melt.	56.00-57.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	25.00-26.00
Short shovel turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Bar crops and plate	59.00-60.00
Structural & plate, 2 ft.	57.00-58.00
Electric furnace bundles	53.00-54.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	53.00-54.00
Stove plate	51.00-52.00
Unstripped motor blocks	45.00-46.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*56.00-57.00*
Rails, 18-in. and under	74.00-75.00
Rails, rerolling	77.00-78.00
Rails, random lengths	69.00-70.00
Angles, splice bars	*70.00-71.00*

PHILADELPHIA

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	48.00
No. 1 bundles	56.00-57.00
No. 2 bundles	45.00-47.00
No. 1 busheling	56.00-57.00
Electric furnace bundles	60.00
Mixed borings, turnings	41.00
Machine shop turnings	40.00
Short shovel turnings	*44.00-45.00*
Heavy turnings	52.00
Structurals & plates	61.00-62.00
Couplers, springs, wheels	68.00-70.00
Rail crops, 2 ft & under	76.00-77.00

Cast Iron Grades

No. 1 cupola	*53.00-55.00*
Malleable	68.00
Heavy breakable cast	*56.00-57.00*
Drop broken machinery	*58.00-59.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	52.00-53.00
No. 2 bundles	40.00-41.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	37.00-38.00
Low phos. (structural & plate)	54.00-55.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	36.00-37.00
Heavy breakable	48.00-48.50

Stainless Steel

18-8 sheets, clips, solids	350.00-360.00
18-8 borings, turnings	200.00-210.00
430 sheets, clips solids	115.00-120.00
410 sheets, clips, solids	105.00-110.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	48.00-49.00
No. 2 heavy melting	*37.00-37.50*
No. 1 bundles	48.00-49.00
No. 2 bundles	*35.00-35.50*
No. 1 busheling	48.00-49.00
Machine shop turnings	29.00-30.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	32.00-33.00
No. 1 cast	*44.50-45.50*
Mixed cupola cast	*40.00-41.00*
No. 1 machinery cast	45.50-46.00

BUFFALO

No. 1 heavy melting	57.00-58.00
No. 2 heavy melting	45.00-46.00
No. 1 bundles	57.00-58.00
No. 2 bundles	42.00-43.00
No. 1 busheling	57.00-58.00
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	60.00-61.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	68.00-69.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	45.00-46.00
No. 1 bundles	56.00-57.00
No. 2 bundles	41.00-42.00
No. 1 busheling	56.00-57.00
Machine shop turnings	35.00-36.00
Mixed borings, turnings	37.00-38.00
Short shovel turnings	39.00-40.00
Cast iron borings	37.00-38.00
Low phos., 18 in.	62.00-63.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	62.00-63.00
Rails, 18 in. and under	*76.00-77.00*
Rails, random lengths	*67.00-68.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	53.00
No. 2 heavy melting	45.00
No. 1 bundles	53.00
No. 2 bundles	41.00
No. 1 busheling	53.00
Machine shop turnings	32.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	43.00
Heavy breakable cast	43.00
Unstripped motor blocks	43.00
Brake shoes	51.00
Clean auto cast	54.00
Stove plate	43.50

Railroad Scrap

No. 1 R.R. heavy melt.	63.50
Rails, 18 in. and under	82.00
Rails, rerolling	90.00
Rails, random lengths	79.00
Angles, splice bars	64.00

SEATTLE

No. 1 heavy melting	50.00
No. 2 heavy melting	46.00
No. 1 bundles	42.00
No. 2 bundles	31.00
Machine shop turnings	25.00-27.00
Mixed borings, turnings	25.00-27.00
Electric furnace No. 1	58.00-60.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Heavy breakable cast	42.00-44.00
No. 1 wheels	37.00
Unstripped motor blocks	44.00
Stove plate (f.o.b. plant)	35.00-37.00

LOS ANGELES

No. 1 heavy melting	50.00
No. 2 heavy melting	47.00
No. 1 bundles	48.00
No. 2 bundles	40.00
Machine shop turnings	29.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.00

SAN FRANCISCO

No. 1 heavy melting	*55.00*
No. 2 heavy melting	*52.00*
No. 1 bundles	*53.00*
No. 2 bundles	*43.00*
Machine shop turnings	*35.00*
Mixed borings, turnings	*35.00*
Cast iron borings	*35.00*
Heavy turnings	*35.00*
Short shovel turnings	*38.00*
Cut structurals	*62.00*

Cast Iron Grades

No. 1 cupola	*60.00*
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	*50.00*
Clean auto cast	*60.00*
No. 1 wheels	*48.00*
Drop broken machinery	*60.00*

HAMILTON, ONT.

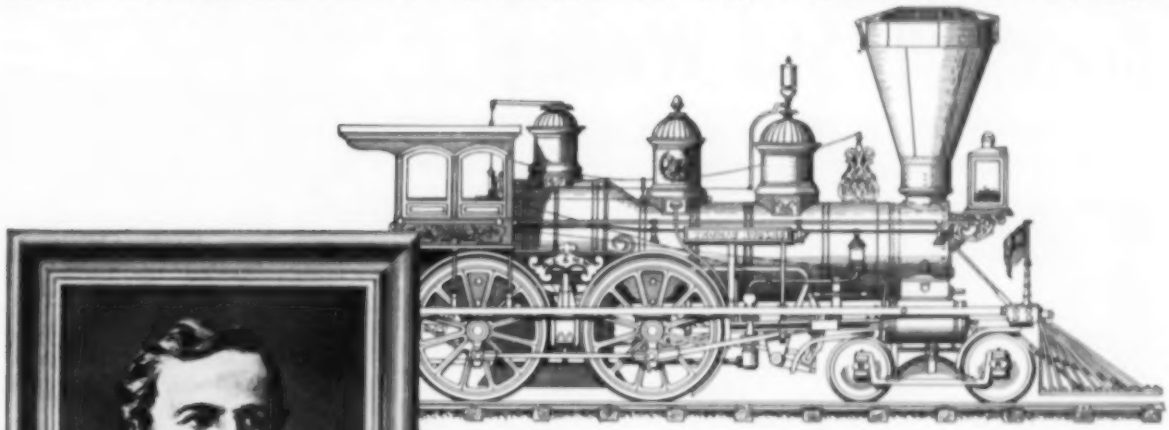
No. 1 heavy melting	52.00
No. 2 heavy melting	47.00
No. 1 bundles	52.00
No. 2 bundles	42.50
Mixed steel scrap	46.00
Busheling, new factory: Prepared	50.00
Unprepared	46.00
Short steel turnings	34.00

Cast Iron Grades

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING



Alexander L. Holley

Locomotive, circa 1860, designed by A. L. Holley . . .
This is the 15th in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1869
Holley Converter

While ten of Alexander Holley's patents had to do with adaptations of the Bessemer process, one being the converter bearing his name, he was primarily concerned with designing locomotives. One of his earliest inventions was a steam engine cut-off, which he completed while he was still in college.

In 1860, he was asked to redesign a locomotive for the Camden and Amboy Railroad and worked with the chief engineer, Robert L. Stevens, on his project for a floating gun battery. Stevens was already well known for his famous invention of the T-Rail. This led to a close study of the metal used in armor plate and Holley went abroad to do research in England. It was this trip which first brought him into the field of steelmaking.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Brass Mills Still Waiting

Third quarter sales were off and the fourth quarter is starting off slowly. A few jitters are developing, but no pessimism. November scramble for copper may result

Nonferrous Metal Prices, Pages 188 & 189

COPPER USERS continue to order hand to mouth. Reasons: 1. Brass mills still have not received a large influx of fourth quarter orders. 2. The British Board of Trade has met with London metal dealers to decide how to dispose of 36,000 tons of Britain's stockpiled red metal.

Sales Gains—Wire and cable makers are helping keep day-by-day copper sales on a relatively high plateau. There are indications that brass mill activity may mushroom soon. Says one independent mill: "We are not pessimistic, but we will be happy to see orders flowing in at a faster rate." A sprinkling of copper fabricators report that orders have jumped in the last ten days and that it may be the beginning of the fourth quarter rush.

While the British Board of Trade will attempt to dispose of its metal in a way that will not depress world copper markets, industry experts point out there is already some excess world production, and each extra pound coming on the market will have some effect.

Prospects—The market is not tight, even though most primary producers are still selling monthly production quotas. But by the first of November, users could be scrambling for all the red metal they can get.

Lead Sales Firm

While some other nonferrous metals wait for the fourth quarter to get going, lead sales are holding at high levels. Example: Sales to the tetraethyl industry are running 20 to 25 per cent ahead of last year's peak total. Over-all lead sales are keeping pace with 1955 totals, and most lead men feel that 1956 results will show a 4 per cent gain over last year's results.

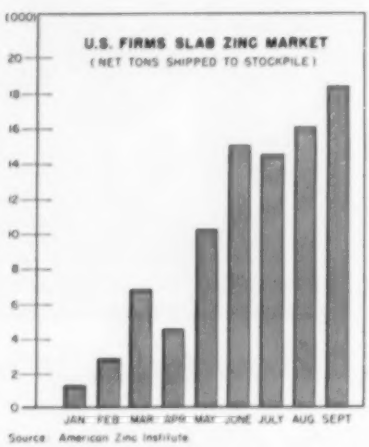
Alumina from Clay

Anaconda Co. is starting on a pilot plant operation which will recover alumina from clay. After nearly two years of laboratory work, it has solved the problem of producing alumina from clay in the Moscow, Idaho, area. When the pilot plant is completed, it will have a 50-ton-a-day capacity. It is anticipated by company officials that full-scale commercial operations will develop from the pilot program. Anaconda's annual aluminum capacity is 60,000 tons.

While the average amount of aluminum going into 1956 automobiles was about 35 lb, look for 1957 models to have an average of about 50 lb a car. Says one aluminum spokesman: "That could be a conservative estimate."

Zinc: New Stability

Primary and secondary producers report that diecasters are beginning to enter the market in force. Galvanizers are buying at a solid rate and should continue



Source: American Zinc Institute

to do so throughout the fourth quarter. Diecasters will hold the key to a peak fourth quarter for zinc sales.

September zinc production reached 90,235 tons, reports the American Zinc Institute. While total shipments increased from 88,017 tons in August to 92,377 tons in September, the government's take for stockpile (see chart) was the largest since January, 1955, when 19,694 tons went into the government account. Bright note: Unfilled orders jumped from 55,769 tons at the beginning of September to 64,450 tons on Oct. 1.

Outlook: There is little doubt that the U.S. will continue to buy quantities of lead and zinc until the first of the year. After that, it could go either way, depending partly on the outcome of the election. But most metals men explain that once an administration has committed itself to stockpiling, it most likely will continue some kind of supplementary program.

NONFERROUS PRICE RECORD

	Price Oct. 10	Last Change		Previous Price	Sept. Avg.	Aug. Avg.	Oct., 1955 Avg.
Copper	39.00-40.00	Aug.	22, 1956	39.50-40.00	39.500	39.750	44.594
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	15.300
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	13.020
Tin	104.75	Oct.	9, 1956	104.25	103.745	99.043	96.230
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Aluminum	27.10	Aug.	10, 1956	25.90	27.100	26.700	24.400
Magnesium	35.25	Aug.	13, 1956	33.75	35.250	34.694	32.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

THIS is a Metal Cleaning and Rust Proofing Machine

. . . it is part of a Complete Mahon Self-Housed Finishing System Installed in 1939 on the Roof of Maytag's Plant No. 1

Conventional Wringer Washer Produced by Maytag in 1939.

Today's Product: The Famous Maytag Wringer Washer Produced Today Receives its Fine, Durable Finish in the Same Finishing Equipment.

Partial View of Maytag's Plant No. 1. The Mahon Self-Housed Finishing System Installed on the Roof in 1939 is clearly visible. Over a dozen other Mahon Installations—Including Two More Complete Finishing Systems—are today in operation in Maytag Plants.

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MAYTAG Conventional WRINGER WASHERS have PASSED THROUGH THIS FINISHING SYSTEM . . . and It is STILL in DAILY USE!

When you hear this statement: "Mahon equipment is engineered better and built better for more economical operation over a longer period of time", it is no idle boast. There are dozens of Mahon Finishing Systems in various industries throughout the country with performance records comparable to this one at Maytag. When you make a capital investment in equipment which so directly affects your production costs and the appearance and saleability of your product, your primary concern should be end results—quality of finish produced, operating efficiency, flexibility of equipment to handle future production loads and model changes, and yearly maintenance requirements—these are the all-important considerations. The lowest price tag doesn't tell the whole story . . . so, if you want good finishing equipment—equipment that is thoroughly engineered and coordinated to do a good finishing job, remember that you can only buy Mahon experience, Mahon engineering and Mahon quality equipment from Mahon. It may cost a little more, but Mahon customers will tell you that "It's the best investment you can make". See Sweet's Plant Engineering File for information, or write for Catalog A-657.

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MAHON

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M brand, 99.5%, 33.00; Lone Star brand, 32.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 39.00 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$108 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15 per lb.

Silver: Open market, 91.00 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 104.75; prompt, 104.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.80, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.50-30.25; No. 12 foundry alloy (No. 2 grade), 25.00-25.50; 5% silicon alloy, 0.60 Cu max, 27.00-27.50; 13 alloy, 0.60 Cu max, 27.00-27.50; 195 alloy, 27.50-27.75; 108 alloy, 25.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.25; grade 2, 24.50; grade 3, 23.75; grade 4, 23.25.

Brass Ingot: Red brass, No. 115, 37.55; tin bronze, No. 225, 48.00; No. 245, 43.50; high-leaded tin bronze, No. 305, 41.00; No. 1 yellow, No. 405, 29.75; manganese bronze, No. 421, 33.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy: Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 45.35¢; l.c.l., 45.98. Weatherproof, 20,000-lb lots, 43.75¢; l.c.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.68¢; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00¢ per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	113	97	118
Strip, C.R.	111	99	128
Plate, H.R.	107	96	111
Rod, Shapes, H.R.	94	80	99
Seamless Tubes	144	120	190

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in. or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.80	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

ALUMINUM (continued)

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.80
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-56.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.9
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Forging Stock: Round. Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares. Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Tread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots) **Aluminum:** 1100 clippings, 16.50-17.00; old sheets, 13.00-13.50; borings and turnings, 7.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.86c	....	61.82	36.000	36.000	35.250
Yellow Brass	52.10	42.65d	52.64	55.01	27.250	27.000	25.125
Low Brass 80%	55.85	55.79	56.39	58.66	30.625	30.375	29.875
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.64	33.125	32.875	32.375
Manganese Bronze	59.46	53.56	63.80	....	25.250	25.000	24.500
Munts Bronze	53.84	49.65	....	....	25.625	25.375	24.875
Naval Brass	55.72	50.03	62.78	58.58	25.250	25.000	24.500
Silicon Bronze	65.22	64.41	65.26	67.26e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.09g	70.09	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

8.00; crankcases, 13.00-13.50; industrial castings, 13.00-13.50.

Copper and Brass: No. 1 heavy copper and wire, 29.00-29.50; No. 2 heavy copper and wire, 28.00-28.50; light copper, 25.00-25.50; No. 1 composition red brass, 24.50-25.50; No. 1 composition turnings, 23.50-24.50; yellow brass turnings, 14.50-15.00; new brass clippings, 23.00-23.50; light brass, 14.50-15.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 21.00-21.50; auto radiators, unsweated, 18.50-19.50; cocks and faucets, 18.50-19.50; brass pipe, 20.50-21.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.50-14.50.

Monel: Clippings, 80.00-90.00; old sheets, 70.00-80.00; turnings, 70.00-80.00; rods, 80.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 19.50-20.00; 3003 clippings, 19.50-19.75; 6151 clippings, 19.50-19.75; 5052 clippings, 19.50; 2014 clippings, 18.50-19.50; 2017 clippings, 18.50-19.50; 2024 clippings, 18.50-19.50; mixed clippings, 18.50; old sheets, 17.00; old cast, 16.50-17.00; clean old cable (free of steel), 18.75-19.50; borings and turnings 16.50-18.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 32.50; No. 2 heavy copper and wire, 31.00; light copper, 28.75; refinery brass (60% copper) per dry copper content, 28.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 32.50; No. 2 heavy copper and wire, 31.00; light copper, 28.75; No. 1 composition borings, 29.00; No. 1 composition solids, 29.50; heavy yellow brass solids, 20.50; yellow brass turnings, 19.00; radiators, 22.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 58.29; oval, 57.54, 5000-10,000 lb; electrodeposited, 50.28; 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.
Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 122.50; 200-499 lb, 121.00; 500-999 lb 120.50; 1000 lb or more, 120.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.
Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.
Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.80; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. Prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 73.30; 100-600 lb, 64.70; 700-1900 lb, 62.20; 2000-9900 lb, 59.50; 10,000 lb or more, 59.30.

Stannous Chloride (anhydrous): Less than 25 lb, 170.80; 25 lb, 135.80; 100 lb, 120.80; 400 lb, 118.30; 5200-19,600 lb, 106.10; 20,000 lb or more, 94.00.

Stannous Sulphate: Less than 50 lb, 133.30; 50 lb, 103.30; 100-1999 lb, 101.30; 2000 lb or more 99.30.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(Concluded from page 183)

Cincinnati — Scrap prices are steady in this area due to a substantial purchase by a local mill. Only prices of short length rails, 18 in. and under, and random length rails, changed last week, both declining $1.

Buffalo — A smaller mill here purchased No. 2 grades at $1.50 below prices paid previously. But because of the limited tonnage involved, the purchase is not considered representative of the market. Consumer prices on mill grades are nominally unchanged.

Detroit — No. 2 heavy melting steel dropped to $41 on a new order placed by Great Lakes Steel Corp. But the market seems to be steady, and the feeling persists that it will stay that way this month.

Birmingham—There is little activity in open-hearth scrap here, but considerable trading is noted in other grades. Some foundries have cut their buying prices on specialty items $1 to $2 a ton.

Los Angeles — Steelmaking grades of scrap are reported scarcer here, and consumers say supply conditions are nearing a critical stage. Heavy exports to Japan are noted.

San Francisco—Some grades of scrap are quoted at the highest levels in history. No. 1 heavy melting steel now is $55. Heavy exports to Japan have forced local mills to lift their buying prices.

Seattle—There is no change in the scrap market here. Dealers report prices are more likely to go up than to decline. Receipts are in good volume. Consumption is heavy.

Washington — Consumption of scrap and pig iron in the first six months this year was 8 per cent greater than in the like 1955 period, reports the U.S. Bureau of Mines. Total: 74,992,301 gross tons, of which 38,744,710 tons were scrap, and 33,247,594 tons were pig iron. In the like period of 1955, the figure was 69,395,631 tons, 35,852,777 tons of scrap and 33,542,854 tons of pig iron.

Consumers' stocks at the end of June included 6,191,341 tons of scrap and 2,086,708 tons of pig iron. This compares with 6,298,618 tons of scrap and 2,046,446 tons of pig iron at the end of the preceding month.

FROM STOCK
IMMEDIATE SHIPMENT
STRUCTURAL WIDE FLANGE BEAMS ASTM-A-7
400 TONS 10" x 5¾" x 21# x 40'
200 TONS 12" x 6½" x 27# x 40'
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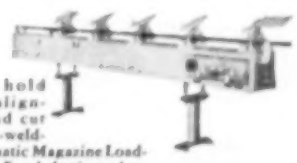
THE WELDED WAY



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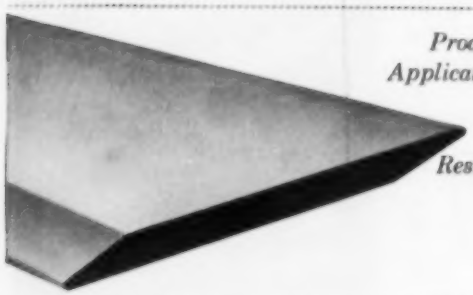
The World's Largest Manufacturer of Arc Welding Equipment

How Special Sections are cutting costs for four manufacturers



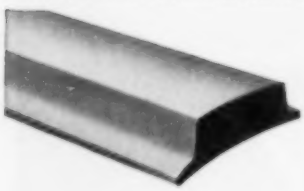
Product: **Cutting edge for earth-moving equipment.**

Application: Our customer formerly flame-cut bevels on square-edge plates to form cutting edges. He substituted this double-bevel carbon-steel special section, which weighs 29 lb per ft compared with the plate which weighed 34 lb per ft.

Results: 1. Because of reduced steel requirements, the section actually costs *less* per ft than the plate.

2. The flame-cutting operation, which cost approximately $1.00 per ft, has been eliminated.

3. Shipping costs were reduced and scrap avoided; production was speeded up and the appearance of the product improved.

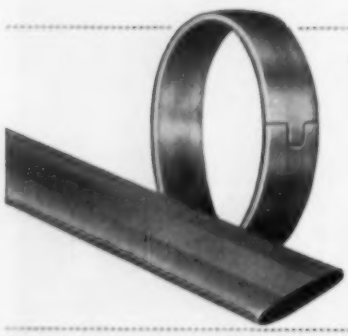


Product: **Pole-piece section for electric motor.**

Application: Our customer had found that laminating these small pieces or forming them hot or cold from flat blanks was costly and inefficient. He switched to a special section rolled to the desired shape and dimensions.

Results: 1. Though the special section costs more than flat stock, the lowered production costs have resulted in significant savings.

2. The customer now gets a better product with fewer production problems.

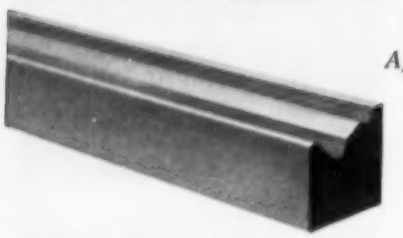


Product: **Timber ring section.**

Application: Customer forms the special section into rings which fit into conforming grooves cut in timbers. Together with a single bolt they provide strong, tight, economical joints for timber trusses. This wedge-shaped ring fits tighter, and can be inserted into the grooves more easily than older-type rings formed from flat strips or single bevels.

Results: 1. One Teco "wedge-fit" connection does the job of 4 to 5 bolts or 20 nails.

2. Easier installation of these rings results in faster production, and savings in time and labor.



Product: **Carriage-rail section for electric typewriter.**

Application: Customer formerly used square stock that required machining away about 17 pct of the metal. This entailed high production costs and metal loss through scrap. He has now standardized on this special section, which is accurately hot-rolled, then cold-drawn to precise dimensions.

Results: 1. Costly machining operations and loss of metal completely eliminated.

2. Production speeded up considerably.

These are but a few examples of the ways in which hot-rolled special sections are being used to advantage. We urge you to consider how special sections could give you greater freedom of design, bypass expensive processing operations and tool costs, cut production time and avoid scrap. We'd be happy to discuss possibilities with you. Kindly call or write the Bethlehem sales office nearest you.

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No. 195

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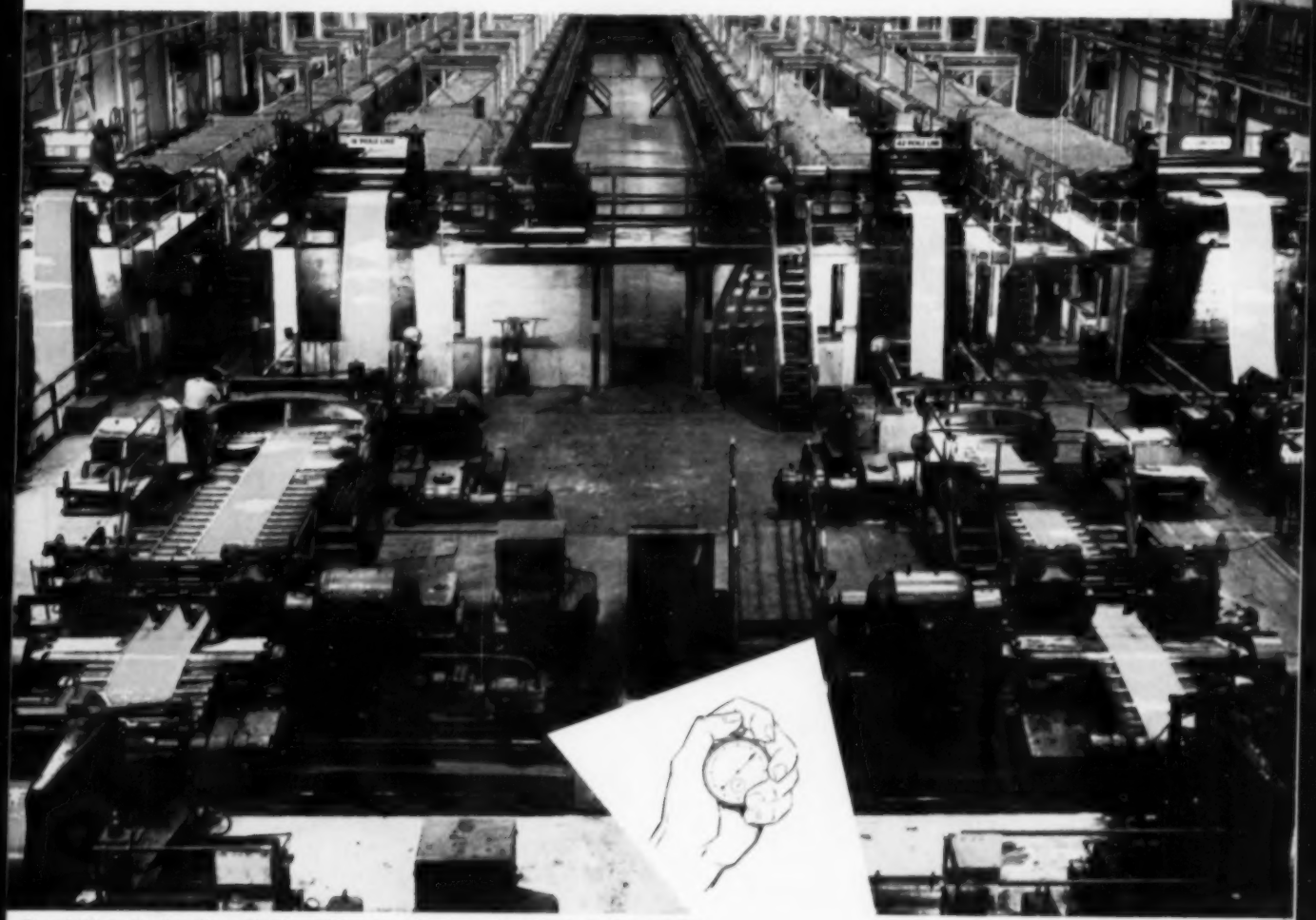

Four high production Wean Pickling Lines at work in one of the nation's largest mills.

....the finest product at record speeds

Wean Pickling Lines are setting production records wherever they are installed. BUT, more important to steel producers is the excellence of pickled product these lines are turning out—even at their fastest speeds.

Part of the story is the double breaker processing uncoiler, right, that properly prepares the strip for rapid and uniform pickling at high speeds. Wean lines are engineered to give producers installations which provide the ultimate in automation and high speed operation.

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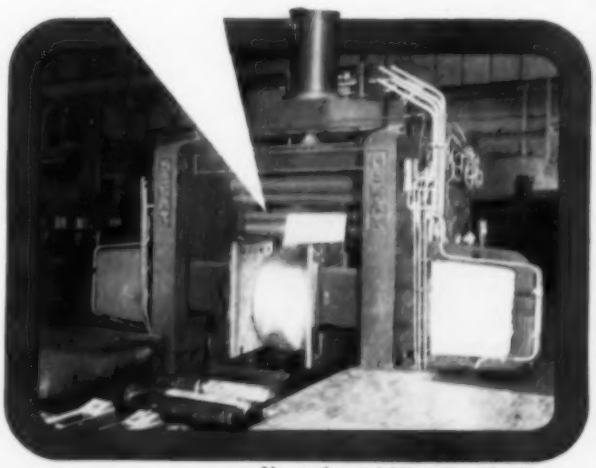

No modern pickling line should be without a McKay Processing Uncoiler to prepare the strip for high speed pickling.

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